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Evolution of the Modern Power Shovel

Ward-Leonard electric makes the old style steamer for mine and quarry use as obsolete as kerosene lamps for your home, says this well known consulting engineer.

By R. S. Walker, Consulting Engineer
The M. A. Hanna Company, Hanna Ore Mining Company, Susquehanna Ore Co.

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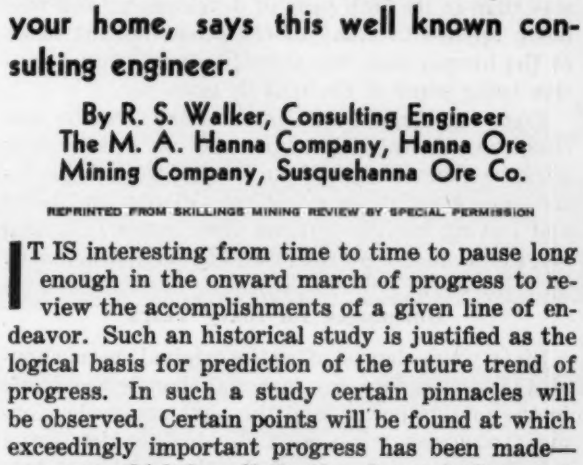
IT IS interesting from time to time to pause long enough in the onward march of progress to review the accomplishments of a given line of endeavor. Such an historical study is justified as the logical basis for prediction of the future trend of progress. In such a study certain pinnacles will be observed. Certain points will be found at which exceedingly important progress has been made—progress which has distinctly advanced the art or



The daddy of them all. The original Otis shovel built in 1837. This shovel was first put to work on a section of the Baltimore and Ohio Railroad in Maryland, later taken to Canada and used on the Welland Canal. After that it was put on a scow and used as a dredge on the Sioux. It was finally wrecked in 1905 or 1906.

quehanna Mine in Pictures

1. Loading ore—new locomotive car haulage system. 2. Loading ore—old steam locomotive haulage system. 3. Headframe—transfer car dumping into pocket. 4. Locomotive car and train. 5. Shaft station—car dumped. 6. Hoist house interior showing Ottumwa ore hoist and General Electric motor and controls. 7. Close-up of automatic transfer car. 8. Headframe over water shaft showing office, warehouse, shops and garage.

e Susquehanna Mine of the Susquehanna Ore Comy on Mesabi Range near Hibbing, Minnesota has been rated by open pit method and being of somewhat reicted area, the track grades became so steep that the nomical limits of standard steam locomotives were ched. This brought about the adoption of a modified lling system in which the ore, loaded by the electric vels into small cars, is hauled through tunnels to a aft and hoisted to surface in skips, where it is transrred to railroad cars.

The following description covers briefly the principal tures of the installation for the milling system: The aft contains five compartments, handling two eight ton ips, cage, counterweight and ladder road. Ultimate depth, proximately 410 feet. Three tunnels will be driven at 290 et, 350 feet and 410 feet.

Three 120-B Bucyrus-Erie electric shovels handle the ading. All are equipped with direct current motors, opated from motor generator set, and having Ward-Leonard stem of control. Power supply carried at 2200 volts, 3 ase, 60 cycles, on pole lines in pit and conveyed to vels by flexible cables. The electric haulage system conts of four locomotive cars, and twenty-eight trailer cars, with capacity of 4½ cu. yds. water level. Gauge 4' 8½". lley voltage, 600 volts D. C. All rolling stock, equipped th Timken bearings and air brakes throughout, was built Differential Steel Car Company of Findlay, Ohio. lley wire is installed at the side of the tracks in the , at a distance of 8 feet from center of track and 8 feet ve top of rail. In tunnels the trolley is 2 feet from nter of track and 8 feet above top of rail.

The hoisting plant consists of a cage hoist driven by 0 H.P. motor, and ore hoist with cylindro conical drum iven by 500 H. P. motor. Both hoists by the Ottumwa n Works, and motors by General Electric Company. e headframe is a steel structure with four pockets. istribution of material from skips to pockets is by autotic transfer cars. Shaking screen is located in headframe r screen ore. Headframe was designed by W. C. Felver, d fabricated and erected by Worden-Allen Company.

Power is purchased from Minnesota Power & Light Comy at 20,000 volts, 3 phase, 60 cycles, and stepped down 2200 volts for use of hoists, electric shovels, pumps and compressor. An additional bank of transformers steps n voltage for 300 K. W. Rotary converter supplying 600 D. C. power to haulage system.

The photographer used a "sky hook" to get this interesting view at Mesabi Chief Mine.

contributed in an outstanding manner to the advancement of the industry.

Almost a century ago, in 1839, at the beginning of the era of the development of the American railroad, Otis conceived the idea of applying the steam engine to the job of handling dirt. The steam engine was then in its 56th year of development and was being applied to many of the other difficult tasks of the human race, the steamboat and the locomotive being some of the notable examples.

From small shovels in human hands, to the mechanically operated machine was an outstanding advance. Compared with the former, the new invention was a giant, relieving man of physical labor and leaving him to perform the control functions only, to be as it were the brain of this new monster.

Unchanged for Sixty Years

Sixty years elapsed after the original steam shovel was built before any material change was made in the motive power, and the next major development occurred when an individual engine drive was furnished for each of the three primary motions of the shovel. By this single change several important advantages were obtained. The slipping type clutch heretofore essential, but a source of trouble from the standpoint of maintenance, was removed from the shovel. The losses involved in the use of clutches made their abandonment an improvement to say nothing of the greater ease of control obtained with the three separate engine drives. The three motions of a shovel do not require the same amount of power, and an excess of power over requirements tends to higher maintenance. For instance, it was undesirable to supply enough power to the thrust motion to raise the boom, for in the release of the boom there was the danger of snapping cables and other parts. Similarly, excess power supplied to the swing mechanism meant unnecessarily expensive mechanical construction, or else high maintenance costs. Even in the hoist where the largest amount of power was required, it was recognized as desirable to have a

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Mesabi Chief Mine in Pictures

1. Office, warehouse, and machine shop under one ro
2. Substation and mine transformer station. 3. Su
station interior—G. E. switchboard. 4. Wrecking cre
5. 60 ton G-E locomotive and train of four 20 cub
yard cars. 6. Nordberg track shifter. 7. Bucyrus-E
120-B, and 60 ton electric locomotive hauling train
30 cubic yard cars. 8. Sanderson Cyclone drill.
9. Screening and washing plant.

The Mesabi Chief Mine of the Hanna Ore Mining Co pany on Mesabi Range at Keewatin, Minnesota compris the second complete electrification of an open pit iron o mine, being preceded by the intallation at the Wabig Mine of the same company. Briefly, the principal featur of the installation are:

Electric shovels consist of one Bucyrus-Erie Model 225 and two Bucyrus-Erie Model 120-B, all equipped with d rect current motors operated from motor generator se and having Ward-Leonard control. Power supply is carri at 2200 volts, 3 phase, 60 cycles on pole lines in the p and conveyed to the shovels by means of flexible cables.

Trains are hauled by four 60 ton **electric locomotive** made by General Electric Company. They are swivel tru type, designed to operate at 600 volts direct current, co tinuous rating 7400 lbs. tractive effort at 14.5 miles p hour; one hour rating 27,200 lbs. tractive effort at miles per hour. Each locomotive is equipped with two operated slider trolleys of side arm type mounted on each side of cab roof.

Sixteen air dump, drop door, double truck type c having 30 cu. yd. water level capacity, handle the ore fr pit to plant. They were built by Differential Steel Car Co pany.

Trolley wire is installed at the side of tracks at a di tance of 10 feet from center of track, and 15 feet above t of rail. No overhead trolley wires are used, as experie gained at the Wabigon Mine proved these unnecessary.

Power is purchased from the Minnesota Power & Li Company at 20,000 volts, 3 phase, 60 cycles, and is step down to 2200 volts for supplying the shovels and local c cuits. An additional bank of transformers is installed step down the voltage for operating the General Elect rotary converter, which supplies the 600 volt direct curr trolley system.

The **screening plant** is of novel construction for handl iron ore, consisting of a combination of fixed inclin grizzly bars and two sets of double opposed shaking grid bars. The screened ore is taken to washing plant by c veyor belt, and rock discharged into dump cars.

The **washing plant** consists of a single unit plant d signed to treat 385 tons of crude ore per hour. It is equipp with one main conical screen, one four-foot Symons D Crusher, one Dorr-Davis Unit, and Bowl Classifier.

At Mesabi Chief . . . loading ore in the foreground with Bucyrus-Erie 120-B . . . stripping with Bucyrus-Erie 225-B shown in upper left.

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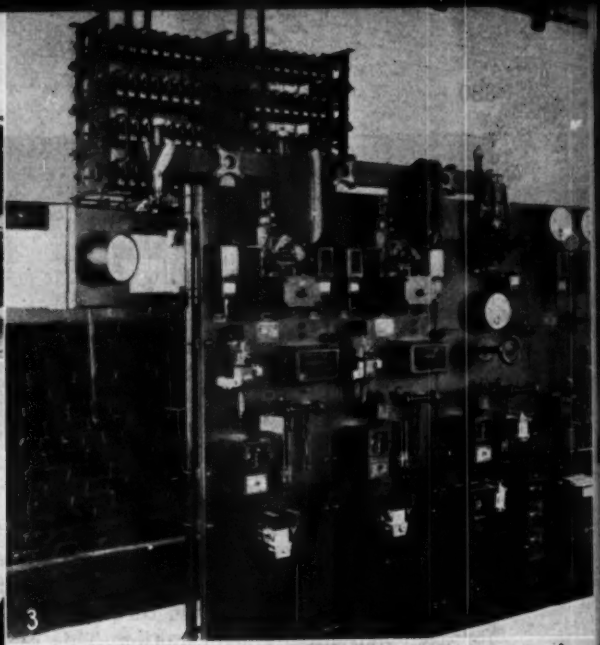

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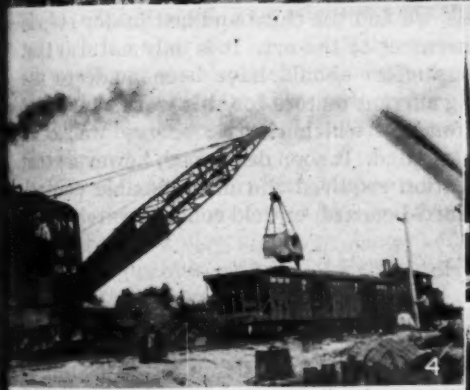

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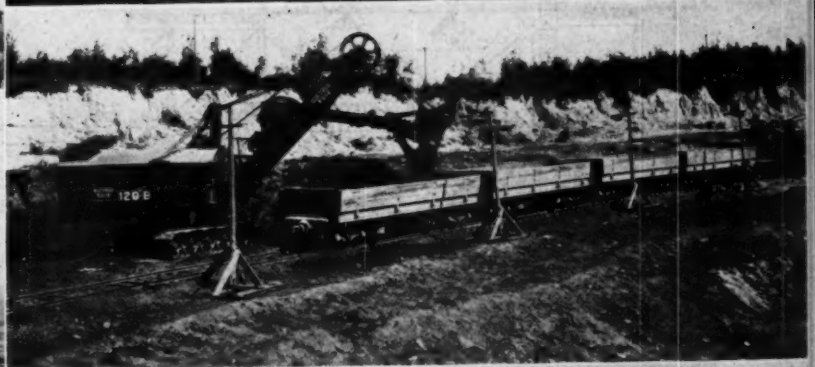
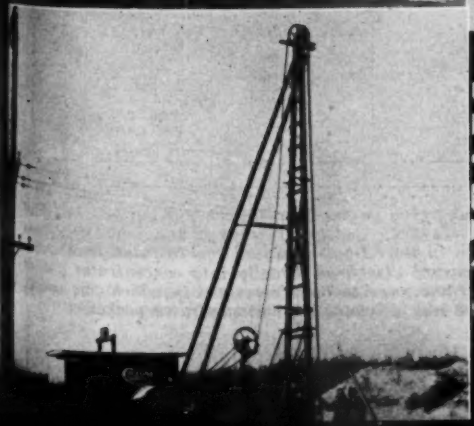
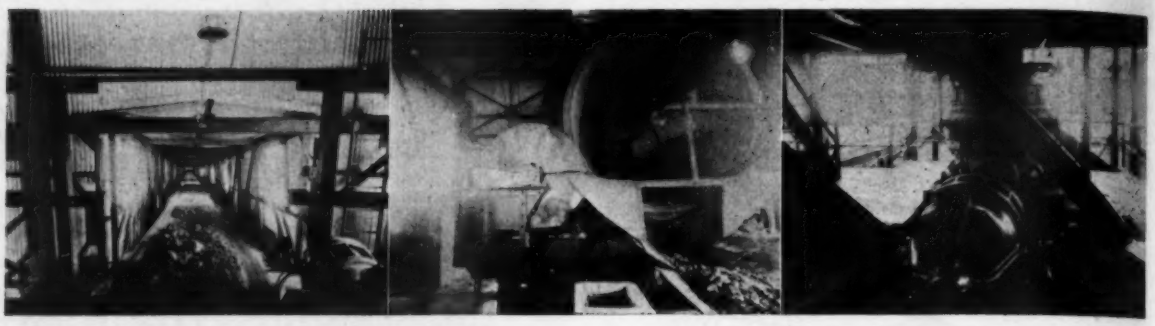






Mesabi Chief Mine washing plant interior, left to right: conveyor belt from screening plant, conical screen and picking belt and 4-foot Symons Disc crusher.

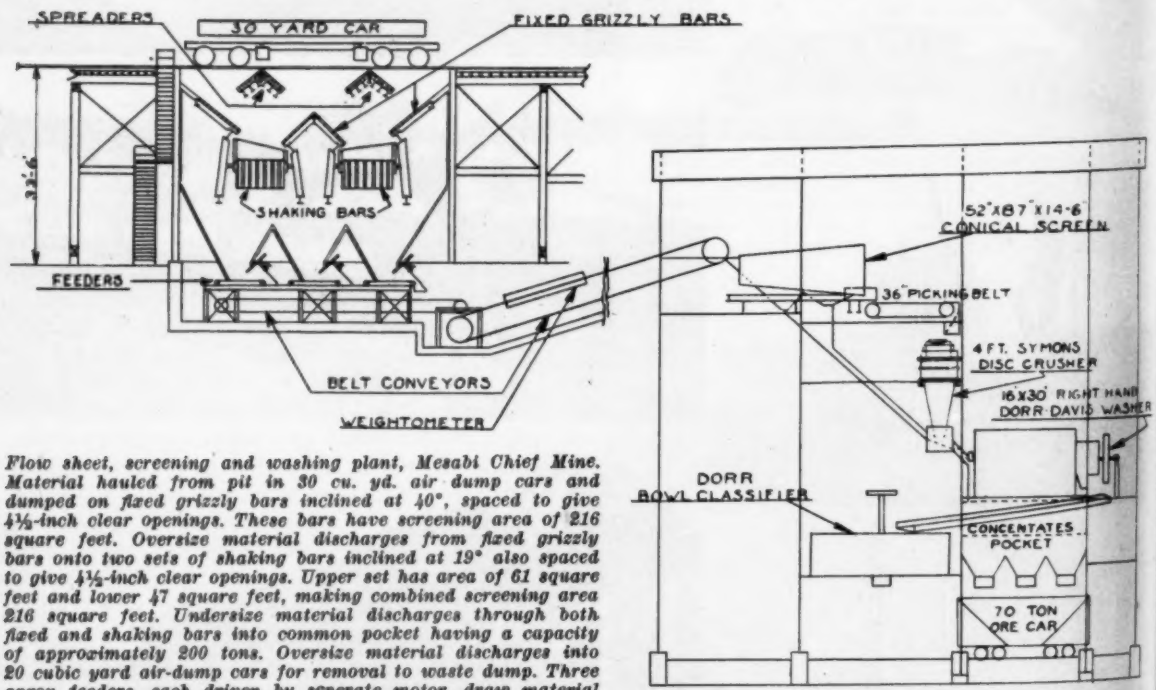
definite maximum limit of torque, to obtain reasonable life from the mechanical equipment.

Inherently the steam engine operating at fixed and easily limited boiler pressures, can develop a definite maximum torque, and by the use of three engines a different maximum torque was available for each individual shovel motion. This made possible a better designed shovel, with the elimination of clutch maintenance.

In spite of the fact that the three-engine driven shovel was far superior to anything that had been produced in the preceding 60 years of shovel experience, there still remained many features of annoyance in the use of steam-driven shovel equipment. The supplying of feed water and fuel, the difficulty of keeping water lines from freezing in winter, and keeping boilers in shape for operation, were some of these problems.

Electric Drive Introduced

In view of these difficulties it was quite natural that the new servant of mankind coming into common use at about this time should be pressed into service on shovel equipment. The writer refers to electricity. In the application of electricity to operate shovels, we find the third and last major step in the advancement of the art. It is only natural that a strenuous effort should have been made to use alternating current motors for this work, since that was the form in which electric energy was commonly distributed. It soon developed, however, that the application required the most flexible control, and the Ward-Leonard, or field control system, with



Flow sheet, screening and washing plant, Mesabi Chief Mine. Material hauled from pit in 30 cu. yd. air dump cars and dumped on fixed grizzly bars inclined at 40°, spaced to give 4½-inch clear openings. These bars have screening area of 216 square feet. Oversize material discharges from fixed grizzly bars onto two sets of shaking bars inclined at 19° also spaced to give 4½-inch clear openings. Upper set has area of 61 square feet and lower 47 square feet, making combined screening area 216 square feet. Undersize material discharges through both fixed and shaking bars into common pocket having a capacity of approximately 200 tons. Oversize material discharges into 20 cubic yard air-dump cars for removal to waste dump. Three apron feeders, each driven by seperate motor, draw material from pocket and discharge onto 30-inch horizontal conveyor which in turn discharges onto 30-inch inclined conveyor running to washing plant. Weightometer is installed on inclined conveyor.

At washing plant material discharges from conveyor belt into conical revolving screen having 1¼-inch perforations. Oversize from screen passes over 36-inch picking belt to 4-foot Symons crusher. Crusher discharge and undersize from screen go to Dorr-Davis washer. Concentrates from Dorr-Davis washer discharge directly into concentrates pocket and overflow runs to bowl classifier in which fine ore is recovered and discharged to concentrates pocket.

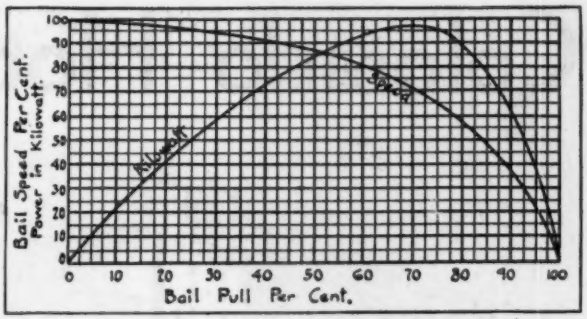
individual motor drive for each shovel motion, came into general use. With this type of control it is possible to obtain the same characteristics which had made the steam engine drive such a success, namely, great ease of control with separate and definite limitation of maximum torque for each motion. These features, together with ideal speed load characteristics, have made this type of drive the accepted standard on all large and moderate sized shovels.

Eliminated Many Difficulties

Not only has the electric shovel eliminated the difficulty which had previously been experienced on the steam machine with water and coal supply, frozen pipes, and boiler maintenance, but the operation cost has also proved in its favor, being found in many cases to be a third the cost of steam operation. Even as the three-engine steam shovel had forced the single-engine shovel into obsolescence, so the three element Ward-Leonard electric drive has forced all of its predecessors into history.

In mining work and quarries, or wherever the service is heavy and low operating costs necessary, it would appear about as reasonable for the shovel purchaser to consider the single motor drive as for him to think of starting his automobile on high gear by slipping the clutch.

The means of furnishing power to the electric shovel, at first viewed with great concern, has proved to be a very simple problem, and by the use of trailing cables, a range of half a mile or more is



Bail Pull Characteristics, Ward-Leonard Drive.

obtained without any complication of wiring or pole work.

Speed and Bail Pull

It may be of interest to refer to the excellent characteristics of the Ward-Leonard or field control system as applied to electric shovels. To make the point clear, the accompanying chart shows the speed versus bail pull, and power bail pull characteristics of the Ward-Leonard electric drive. It will be noted that at zero speed a definite bail pull is obtained (100%). This is a fixed limitation to the stresses that can be obtained with legitimate load (resembling the steam engine when stalled at full boiler pressure). Attention is called to how rapidly the speed increases with a small decrease in bail pull until at 70% bail pull a speed equal to 70% of

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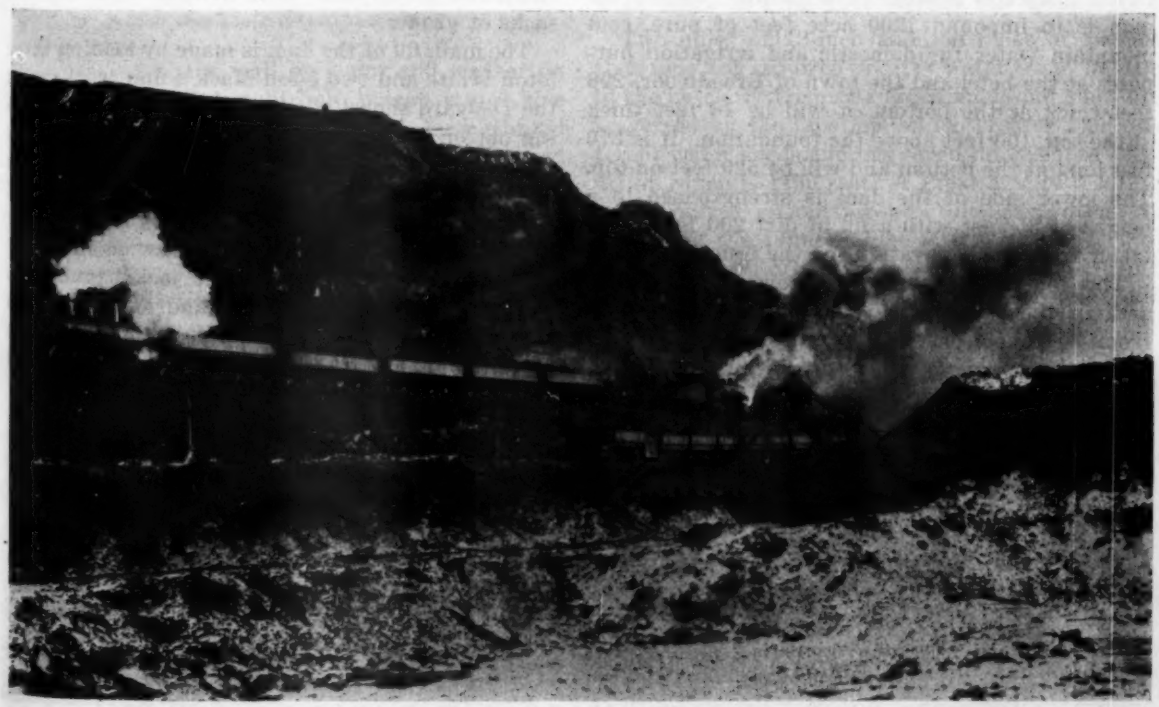


Two of the three Bucyrus-Erie Ward-Leonard electrics at the Susquehanna mine. The upper shovel is cleaning up ore that can still go over the switch backs out of the pit. The lower machine is loading a train for the tunnel and hoist system.

Colorado Hotel Builds Dam and Pipe Line

COURTESY THE DU PONT MAGAZINE

The Broadmoor, swank hotel of the Rockies, near Colorado Springs, Colorado, is spending $600,000 to bring its guests the sparkling mountain water for which the region is noted.

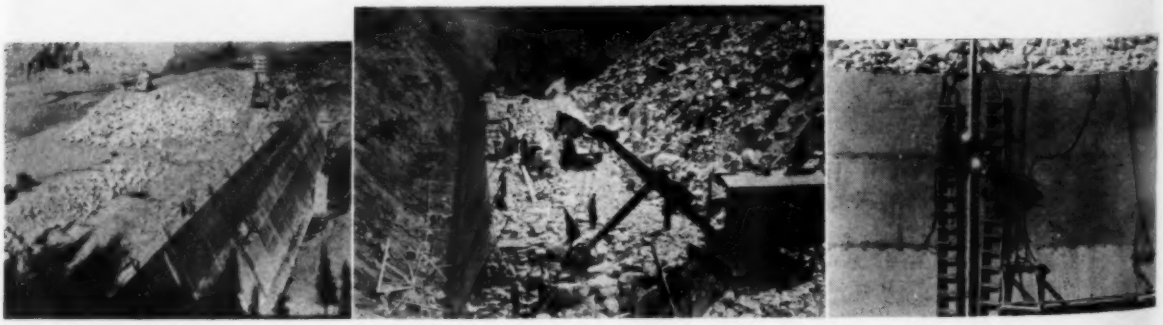
Contractor E. H. Honnen has rugged work in Cripple Creek mountain range.

By Jos. C. Coyle

SEEPAGE, that aggravating foe of rock fill dams, is believed to be conquered in the construction of the Penrose Rock Fill Dam, near Rosemont, Colorado, under construction for the Broadmoor Hotel Company, of Colorado Springs. 9,665 feet above sea level, in the mountains between Colorado Springs and Cripple Creek, the dam is to impound 1200 acre feet of pure, cold mountain water for domestic and irrigation purposes at the hotel and the town of Broadmoor. 206 feet thick at the bottom, it will be 16 feet thick at the top, 100 feet above the foundation. It is 270 feet long at the bottom and will be 520 feet on top. The lower side of the dam is strengthened to a height of 35 feet with a fill of dirt 200 feet wide, taken from the excavation for the foundations.

The foundation excavation covered the entire area of the base of the dam, the depth ranging from 20 to 55 feet. Many large boulders were encountered and were broken up with pop shots. The material was loaded into dump trucks with 1½-yard Marion and ¾-yard Bucyrus-Erie shovels. A cut-off trench six feet wide and 12 feet deep located above the upstream toe of the dam was blasted with short holes to avoid shattering the walls. It was filled with reinforced concrete. 84 staggered grout holes were drilled, requiring 150 sacks of grout.

The main fill of the dam is made by loading three 5-ton White and two 5-ton Mack dump trucks with the 1½-yard shovel at the quarry nearby and backing out on the fill to dump. The ¾-yard shovel is used in placing heavy stone on the fill. 2000 to 2500-yards of rock is broken down per round of about 35 20-foot holes in the quarry face. The face which is shot in benches is 250 feet wide and about 130 feet high. Gardner-Denver jack hammers, a Sullivan oil forge, Ingersoll-Rand sharpener and three 110-foot Sullivan portable compressors are used. Holes are loaded with duPont 40 per cent



Left: Excavating for abutment and placing heavy stone for masons. Center: General view of dam and quarry showing steel face. Right: Welding spherical shell over expansion joint.

quarry dynamite, and fired with a duPont electric blasting machine.

Dam Faced With Hand Placed Stone, Rubble Masonry, and Sheet Steel.

Covering the loose fill on the up-stream side is a strip of hand-placed stone 11 feet thick at the bot- a rubble masonry wall 11 feet thick at the bottom tom and 4-feet at the top. Outside of this there is and 3 feet at the top, set in cement. The upper face of this wall is plastered with 2 inches of cement plaster, in which wood strips are inset and later removed, thus providing room for the seam bolts in the steel plate with which the dam is faced. 100 by 240 inch copper-bearing sheets are used, hoisted into place with a hand-crab. They are supported every 40 feet on 6½-inch tee beams. At every other joint a space of 2½ inches is left between the sheets for expansion. The edges of the plates

Breaking boulders in excavation.

are anchored to the wall by a nut and washer on the end of a ¾-inch split bolt, driven into a hole drilled in the face, and held in place by a pointed key which is first inserted in the hole. A half-round steel shell is welded over each expansion joint, using fillets the thickness of the plate, to make the joints impervious.

The plates lap on the horizontal joints and are bolted every 18 inches. Seams and bolt heads are all electric welded, using copper bearing rod. All bolts, nuts and so forth are also copper bearing to prevent rusting. One General Electric and two U.S.L. portable welders are being used. Thickness of the steel sheets varies from ¼-inch at the top to ⅜-inch at the bottom tier.

A reinforced concrete outlet tower, 8 feet in the clear and with walls 30 inches thick at the bottom

A section of the pipe line on mountain side. Only shallow excavation was required.

and 10 inches at the top, covered with a concrete control house, was built into the dam. There are two steel outlet pipes, equipped with double valve emergency control. A 14-inch outlet will carry water for the hotel and a 24-inch line will by-pass water rights held below the dam.

There is about 2000 yards of concrete in the dam with 3755 pounds of reinforcing in the toe of the dam and in the outlet tower. Crushed stone was hauled from Cripple Creek, a distance of twenty miles, and sand from Colorado Springs thirty miles away, by winding mountain road. A ½-yard Wonder mixer is used for concrete and a ¼-yard Koehring for mortar.

12 Miles of Pipe Line Across the Mountains

Two miles of 13-inch and ten miles of 10-inch steel pipe was required to carry water from the dam to the hotel. Extremely rugged mountain sides are traversed by the pipe line which crosses four different water sheds and has seven tunnels, the longest of which is 1150 feet. A great deal of blasting was required on outside pipe line excavation, as well as in the tunnels. The latter, 5 by 7 feet in diameter, were drilled in eleven-hole rounds, using a Gardner-Denver portable compressor and jack

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The Penrose-Rosemont Dam, stemming the spring torrents of Beaver Creek, will impound a large artificial lake nearly two miles above sea level.

COURTESY THE DU PONT MAGAZINE

Excavating for New Government Building at Washington

Shea Construction Company encounters tough digging in old foundations.

IN Washington, D. C. on Constitution Avenue between 12th and 13th Streets, The Jas. Stewart Company, Incorporated, of New York City will start building the monumental group to be known as the Interstate Commerce Commission and Labor Building on a contract amounting to $9,080,000.

The excavation for this beautiful new edifice amounting to 135,000 yards (and completed under a separate contract) classified simply as common clay and foundation. The classification does not suggest a particularly difficult job of digging but it was a difficult job and the difficulty lay in that work classified as "foundation." Reinforced concrete three and four feet thick, with steel rails laid in tiers formed the reinforced foundation for a power house. Difficult digging—ask J. E. Shea of the Shea Construction Company who took the contract for the excavation. The "common" was in the minority —it was either clay or mighty tough foundations. Considerable wet weather was encountered and every yard had to be trucked out over rails and timber roadways. The work started on October 1, 1931 and was completed in three months.

Two Gas+Airs on Job

The Shea Construction Company moved in Morauer Brothers & Hartzell's Bucyrus-Erie Gas+ Air at the start and a little later M. J. Dugan's GA3 was also brought on to the job.

It was necessary to make a haul of some two miles over into Virginia to dispose of the material and ten to fifteen trucks per shovel were used to keep the dirt moving. Water was removed by means of electric pumps discharging into eight inch mains. The loading out of the old foundations presented by far the most serious problem. The location of the work, in the center of the city, made it impractical to use anything but very small charges of explosives. A great deal of the old foundation was drilled by Ingersoll-Rand Jackhammers with detachable bits and shot with duPont dynamite. In many cases the unusual reinforcing made the dynamite ineffective.

Here are some samples of what "foundation" meant on this Shea Construction Company contract.

Interesting Method Developed to Cut Old Piling

A number of pilings were encountered with their tops in concrete foundations and extending down

These two "before and after taking" pictures show the piling problem which Mr. Shea solved by boring a hole in each pile just below the concrete and inserting a half stick of dynamite.

The two Gas+Airs and, in the center, some of the men responsible for putting through the job.

into the earth below. After the earth was excavated it was impossible to saw off those piles on account of muck and water directly under the concrete and also because the piles were set as close as 3' centers. Mr. Shea of the Shea Construction Company conceived the idea of boring a one and a quarter inch hole three quarters of the way through, at right angle to the pile, just below the concrete mat—then load it with a half stick of dynamite. Firing this was successful in shearing the pile flush with the concrete. By this method they could break up the concrete, then pull the piles after the debris had been cleaned out with the shovel.

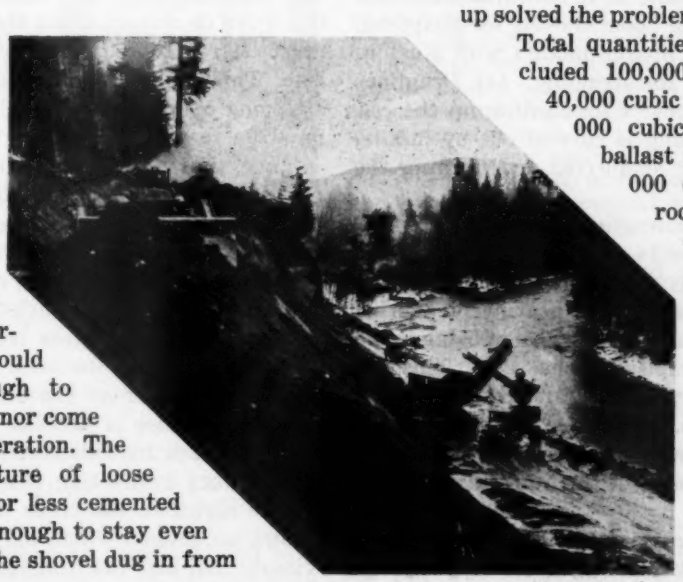
A large portion of the concrete was broken with a machine furnished by the Concrete Cutting Corporation of America. This machine, as efficient as it is unique, is truck mounted. By means of compressed air supplied by a Schramm compressor mounted on the body it delivers repeated and powerful blows with a cutting tool—after the manner of a steam hammer found in the ordinary forge shop.

Mr. Digulian was Superintendent for the General Contractor of foundations, McCloskey & Company. Mr. Christensen was Superintendent for the Concrete Cutting Corporation of America located in New York and J. E. Shea and J. L. Ingle (a partner in the Shea Construction Company) were in active charge of the work for the excavating contractor.

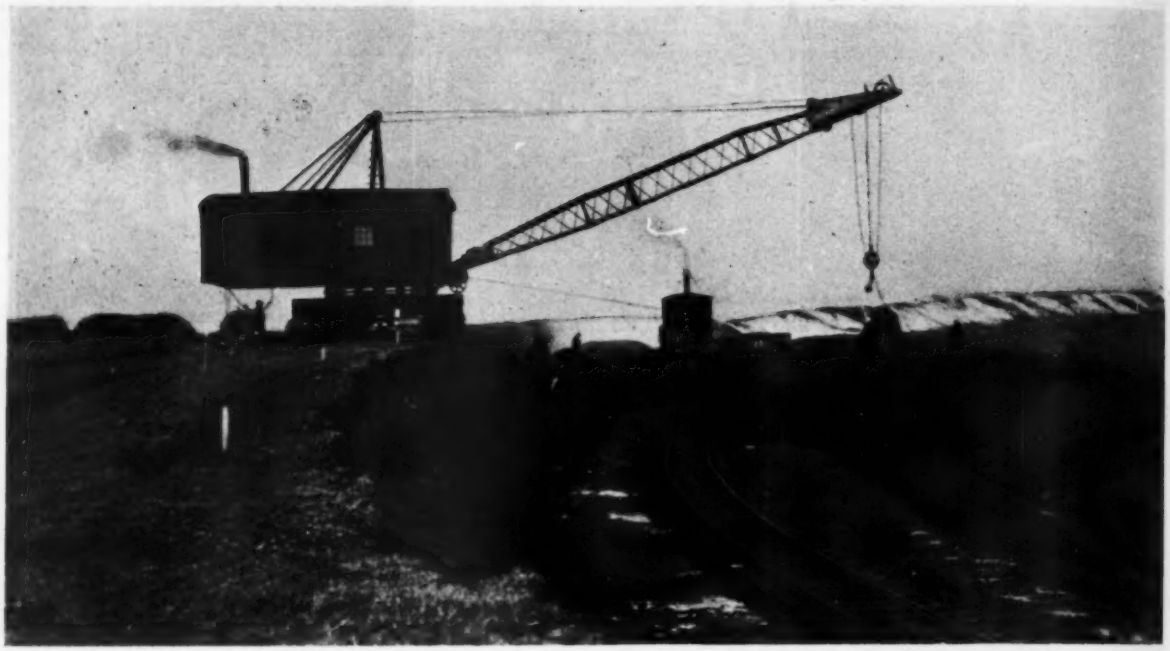
Bulldozer Assists on Difficult High Bank

IN their excavation on the Packard Creek to Greenwater River section of Natches Pass Highway 410 about 48 miles East of Tacoma, Edlefsen-Weygandt encountered an interesting problem in widening into a high, almost-vertical bank which would not stand firm enough to hold for a two-lift cut nor come down for a one-lift operation. The material was a mixture of loose earth, clay and more or less cemented gravel standing firm enough to stay even when undermined as the shovel dug in from the bottom.

The contractor's solution was to bulldoze the upper part of the bank down to the shovel with a Caterpillar and LaPlant Choate bulldozer. This set-up solved the problem quite satisfactorily. Total quantities in the contract included 100,000 cubic yards earth, 40,000 cubic yards solid rock, 30,000 cubic yards river gravel ballast under macadam, 25,000 cubic yards crushed rock for surfacing, and clearing, grubbing and hauling 10 miles to mill, four million boom-feet of very heavy logs. Equipment used included P & H shovels and Mack trucks. The Caterpillar 60 had as alternate equipment a two drum Willamette hoist in addition to the La Plant-Choate bulldozer.



A double play, tractor to shovel to truck. The White River along side the road comes direct from Rainier's glaciers.



Ironstone Quarrying in England

THE Stanton Ironworks Co. Ltd., of Stanton, near Nottingham, England, is the largest iron company in England. They employ in their various open-cast mines or quarries, about 25 Ruston-Bucyrus and Bucyrus-Erie machines.

These machines include: (1) Shovels for digging the iron ore, or ironstone as it is commonly called in England. (2) Long boom shovels for stripping. (3) Shovels working in conjunction with Ruston-Bucyrus transporters for stripping. (4) Draglines for stripping. (5) Shovels for loading up the calcined ore. The calcining is carried out by mixing the "raw" stone with small coal and burning the "heaps."

Included among the draglines for stripping is the old Bucyrus-Erie Class 14 dragline, which although about 16 years old, is giving excellent service, so much so that the Stanton Co., hearing of another used machine of similar size and design being in the market for sale, promptly purchased it. This machine is now being overhauled and reassembled in one of their quarries.

The Stanton Company has six ironstone quarries situated in various parts of the Midlands and East Midlands.

Ironstone in England is found in beds usually from 6 feet to 12 feet thick, the cover varying from a few feet up to as much as 40 feet or 50 feet. These workings in England are so very different from the big iron mines up in the Lake Superior region that they may be of interest to some of our readers. For instance, the iron contents of the ironstone only run out at about 30% to 35% iron. The deposits, too, are comparatively small as compared with the big workings in America. In many instances the ironstone lies beneath valuable agricultural land and it is necessary to restore the land after taking the ironstone out. This means that not only must the cover be removed, but the loam on the surface must be replaced on the sub-soil upon the dump side. This adds, of course, considerable expense to stripping operations, as the loam or cultivated soil must be removed separately from the sub-soil.

Some years ago the Stanton Company experimented with a smaller dragline than the Class 14, and found that it was quite possible to remove the cover in two operations; first the loam and then the sub-soil, the loam being dumped on to the sub-soil excavated on the previous cut.

The dragline operators become very expert, not only at separating the loam from the sub-soil, but spreading it over on the dump side, so that very little hand labor is necessary to level the ground, and restore it for cultivation purposes.

It is very interesting to anyone not accustomed to the sight, to see crops of various kinds being grown on ground which only a month or two previously had had the ironstone removed from it, in fact, it is no very uncommon sight to see crops being sown or growing quite close to the machines which are busily engaged stripping and digging the ironstone.

FIELD NOTES

Heat Prostration of Employees

THE arrival of hot weather makes of timely interest a decision lately rendered by the Connecticut Supreme Court of Errors in the case of Bailey v. Mitchell, 156 Atl. 856.

A steam shovel engineer died of high blood pressure, aggravated by heat prostration, and suffered three weeks before his death. The day he was stricken he had not worked, excepting four or five periods of ten minutes each in moving timbers for a runway on which to move the shovel out of an excavation. His widow asked an award under the Connecticut Workmen's Compensation Act, on a theory that the heat stroke was an injury arising out of his employment.

In denying an award, the court said that there was nothing to show that the working conditions exposed decedent to heat stroke any more than other people generally in the community were exposed. The opinion adds:

"It is only when the exposure in the specific employment as from heat and the effects of the sun is substantially greater than that to which persons generally in that locality are subjected that the injury may be held to rise out of the employment."

—*A. L. H. Street, Attorney-at-Law.*

Makes Good Hand Sign

HAND warning or stop signs are often made in a hurry of a good many things by no means handy, practical or convenient for the purpose. The illustration shows how several were made on short order of cheap inexpensive kitchen stove mats. The wire handles are already on and a part of the sturdy rim. The white asbestos disc 8½ inches in diameter affords an excellent background for lettering of sufficient size and height to be visible for a long distance. A ring in the handle end makes it possible to hang them up almost any convenient place about the truck or machine, and the mats being light, a drop or fall will not injure them or anything they might hit. These mats can be procured in any ten cent store for just that amount.

—*Frank W. Bentley, Jr.*

Cost of Workmen's Compensation Insurance

SIX COMPANIES (INC.) entered into a contract for the construction of Hoover Dam, Boulder Canyon project. The contractor was ordered to perform extra work under an article of the contract providing "The extra work and material shall be paid for at actual necessary cost as determined by the contracting officer, plus fifteen per cent for superintendence, general expense and profit. The actual necessary cost . . . will in no case include any allowance for office expenses, general superintendence or other general expenses." By another article of the contract it was provided that the decision of the head of the department upon questions of fact should be final and conclusive. The contractor incurred expense for workmen's compensation insurance on the work so performed, and made a claim for this expense as an item of the cost of the extra work. The department decided adversely to the contractor's claim, and upon appeal to the Comptroller General, the claim was disallowed, by decision dated March 28, 1932, the cost of the insurance being held to be a general expense. The Comptroller General pointed out that the decision of the department was final under United States *v.* Mason & Hangar Company, 260 U. S. 323, and Ley & Company *v.* United States, 273 U. S. 386.

—*The Reclamation Era.*

Misrepresentation of Character of Subsoil

AS A GENERAL proposition of law, an excavating contractor has the right to rely upon the representations of an owner as to the character of subsoil to be excavated, when the latter assumes to speak from superior knowledge on the subject. Further, the fact that the owner acted in good faith in making representations may not save him from liability for loss caused a contractor in relying thereon, if they in fact prove false and misleading. The application of this rule of law is illustrated in a striking manner in the recent case of E. & F. Const. Co. v. Town of Stamford, Supreme Court of Errors of Connecticut, reported in 158 Atl. 551, which arose under the following facts.

In this case plaintiff signed a contract to erect a school building for the lump sum of $838,998, which included all necessary rock excavation. However, in arriving at this amount plaintiff relied upon the plans furnished it by defendant which purported to show the character of the subsoil. According to these plans, which recited the result of 38 borings on the site, there was only approximately 150 cubic yards of rock to be excavated.

However, when plaintiff started to excavate it encountered a solid ledge of rock not shown on the plans, and was required to excavate over 6,000 cubic yards of rock over and above that shown on the plans. Upon making this discovery plaintiff made timely protest, proceeded with the work, and upon completion presented a bill for the excess rock excavated over that called for by the plans at the rate of $4.50 per cubic yard. Defendant declined to pay. Suit followed, and the higher court in upholding plaintiff's right to recover said:

"Here there is no allegation of fraud, and no suggestion that the members of the defendant's building committee acted in bad faith. The plaintiff alleges that the representations of the quantity of rock to be excavated were grossly inaccurate and misleading, and that, in consequence thereof, it was compelled to expend a large sum of money in excavating rock in excess of the amount shown upon the drawings. . . .

"It is clear that the purpose of these representations was to supply information to bidders upon the job who were expected to act upon it, and entitled to act upon it, in making their bids. . . . They were authoritative and misleading. . . . The plaintiff was entitled to rely upon them and did

(Continued on Page 412)

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The Business Situation

BOTH political parties of the United States have met, constructed their political platforms for the coming campaign, nominated their candidates and the conventions have passed on into history. The parties could exchange the economic portions of their program without embarrassment to either and there seems no reason to worry about the effect of the coming political campaign on business. Presidential election years in the past have made little difference in the business activity of the country and there seems no reason why this year should be an exception.

As this is written, complete figures of business activity for the month of July are not available but such indicators as are available for the first portion of this month tend to indicate some slight increase in activity although it is far from being apparent in every field.

There have been few fundamental changes in the past few months although there has been a continuance of the creation of credit reserves by the Federal Reserve Bank. Before the end of every depression there has appeared in the New York banks a surplus of reserves which has been followed in due time by expansion of industrial credit and expansion of industrial activity.

It is true that the Federal Reserve's purchase of Government Securities has been pumping credit into our financial structure for several months but it has had to absorb during that period both a large exporting of gold and a sizeable reduction of commitments by member banks to the central bank.

New York reserves, however, now stand at a point where it is reasonable to expect a gradual expansion of credit, a gradual change from a situation where caution is the paramount consideration to a situation where fear has been placed in the background.

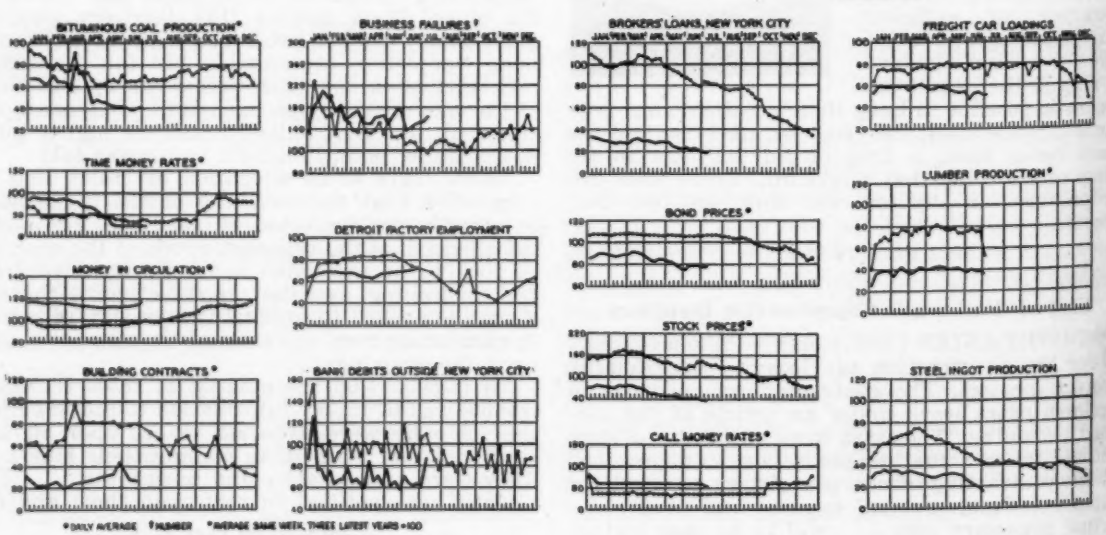
It is interesting to note the comment of a Canadian economist to the effect that "in the United States it was not until early in 1932 that a comprehensive plan was formulated to check depression . . . the sporadic efforts on the part of various agencies prior to this spring were on too small a scale—they had no co-ordination . . . " Canada's depression has been less severe than ours and this view from someone on the side lines is decidedly interesting. It seems, to be sure, as if we had at last embarked upon a co-ordinated plan to rid the country of the hesitation born of fear and readjust the badly dislocated relations of trade and finance. In retrospection it seems odd that we could not earlier have presented a united front. We cannot plead ignorance for the following account suggests that the economic principles involved were understood over 2500 years ago.

Inflation and Deflation in 500 B. C.

From the archives of ancient China comes a monetary treatise which might be considered a commentary on current events if modern terms and usages are substituted for those which then

WEEKLY BUSINESS INDICATORS

WEEKLY AVERAGE, 1923-1925, INCLUSIVE=100



prevailed. The increase in the value of gold between 1929 and the present date might be likened to the substitution of the heavier coins mentioned in the text that follows. Purchasing power is no longer decreasing or increasing by changing the weight of coin, but it is done more effectively by action of the central bank. The failure to prevent a fall in world prices by appropriate banking policy has, in effect, created "heavier money" with all the disastrous results forseen by Shan Mu-kung.

In the thirteenth century the scholar statesman, Ma Tuan-lin, compiled a large encyclopedia of general information based upon orginal Chinese sources. The particular passage given below was written twenty-five hundred years ago during the Chou Dynasty; it was translated in the Gest Chinese Library at McGill University.

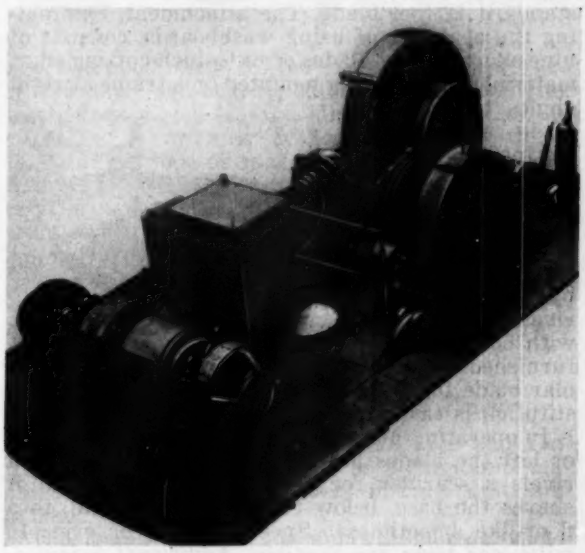
"In the year 524 B. C., Emperor Ching of the Chou Dynasty thought that the coins in circulation were much too light, and issued an order to mint heavier coins and banish the light ones entirely from circulation . . . Regarding this drastic change, Shan Mu-kung, a minister of the government, comments as follows: From time immemorial the monetary system of the country has always been so regulated as to relieve the people in time of distress (i. e., economic depression). When the inconvenience of the people is not great more heavy coins are put into circulation for the reason that when the coins are light prices of commodities go up. In this case the heavy coins are standard value; while the light ones are auxiliaries—but they are both in circulation. On the other hand, if the inconvenience of the people is great they cannot bear the burden of heavy money. The light money automatically becomes the standard value and the heavy auxiliary.

"Now, the Emperor has ordered the abolition of light coins completely. The immediate result of this change will be an enormous decrease in the income of the people and consequent hoarding will be inevitable. All this causes a bad effect on the national treasury and directly raises the rate of taxation. When the rate of taxation is raised, financial disaster and political discontent follow.

"Preparation should be made in advance to meet the coming of a financial crisis. If remedy is to be applied only after the crisis has arrived it may be impossible to meet the exact condition and consequently will cause great anxiety."

Evolution of the Modern Power Shovel

(Continued from Page 381)



Machinery deck view of the Bucyrus-Erie 120-B with Ward-Leonard control.

full load speed prevails. At this point maximum shovel utility is obtained. The properly designed and applied electric shovel handles the major part of its load within 60% to 80% of maximum bail pull. This results in a very snappy machine and experience has shown the electric shovel not only has all the good characteristics of the steam machine, without any of its drawbacks, but is faster and has more capacity size for size over a given length of time.

A further advantage is the fact the Ward-Leonard control provides the most satisfactory means of braking by regeneration. In this arrangement the speed of the falling dipper is controlled by causing the motors to operate as generators and return power to the line, instead of having to use mechanical brakes with their attendant upkeep expense.

In fact today I think I can state that users of large and moderate sized shovel equipment in any locality where electric power is available would no more install anything but an electric driven shovel than we would revert to the use of kerosene lamps in our city homes.

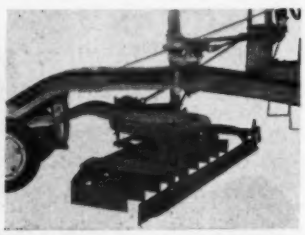
"Is there a mechanic in the audience?"

BY RALPH LANE COURTESY COLLIER'S

EQUIPMENT YOU OUGHT TO KNOW ABOUT

Multiple Blade Arrangement for Auto Patrols

THE NEW multiple blade attachment for auto patrols, recently announced by *Caterpillar Tractor Company, Peoria, Illinois,* is designed to cover a swath equivalent to that obtained by the use of a standard 12-foot blade. The attachment, eliminating the necessity of using washboards, consists of nine short cutting blades of 8x½-inch cutting edge, material 27 inches long mounted on a frame at right angles to a leveling blade of 8x½-inch cutting edge material 12 feet long.



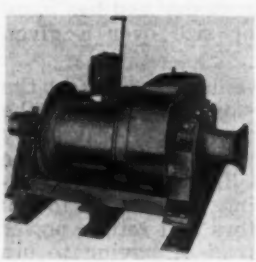
Installation on "Caterpillar" auto patrols in the field may be accomplished by cutting only two rivets and replacing with bolts which are furnished. If at times it is desirable to use a regular blade for shoulder trimming, or the like, substitution is easily effected.

In operating position angled slightly to the right or left the blades have a very sharp cutting that rivals a scarifier for cutting the bumps, and it shaves the base, below the surface material, to a floor-like smoothness. Speeds of 6½ or even 10 miles per hour are possible. Additional information may be obtained by writing Caterpillar Tractor Company. Please mention *Excavating Engineer.*

Combination Drum and Capstan Car-Puller

A NEW drum and capston car-puller for "spotting" a train loaded railroad cars in either direction and at the low rope speed has recently been announced by *Fridy Hoist and Machinery Company, Mountville, Pennsylvania.*

One man operating a car-puller of this type has complete control of all car replacements. For handling a long haul of 900 feet and under steel cable is used on the drum, and for shorter hauls less than 300 feet the capstan is used to advantage with manilla rope.



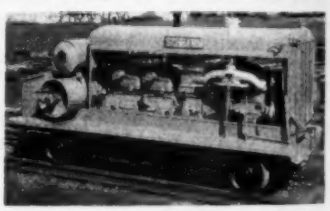
This new device is available in 7½, 10, 15 and 20 H. P. motor ratings for "spotting" a train of 500 tons and under. Special features embodied in the design and construction include: A Double V shaped friction clutch (asbestos lined). Improved type of screw thrust assuring a positive grip and release of the drum by a slight movement of the operating lever. This protects both the motor and mechanical construction of the car-puller against excessive strains and shocks when starting a heavy pull. The triple spur gear drive is of steel and enclosed in an iron housing. The main operating lever, motor control switch and foot brake are all located within easy reach of the operator. The complete car-puller is mounted on a steel I-Beam sub-base. When writing the manufacturer for additional details, please mention *Excavating Engineer.*

Aluminum Welding Rod Available in Coils

BOTH the Oxweld No. 14 Drawn Aluminum Rod for welding sheet aluminum and the Oxweld No. 23 Aluminum Rod for welding cast and sheet aluminum and aluminum alloys are now available in the form of 10-lb. coils of ⅛-inch diameter rod, according to a recent announcement by *The Linde Air Products Company, 30 East 42nd Street, New York, N. Y.* Many users have found that it is advantageous to use aluminum welding rod in coil form for certain work. In production work the amount of waste from short ends is reduced, and under many conditions the welding operator can handle tightly wrapped coil more easily than a 36-in. straight length.

Self-Propelled Railroad Compressor

AN AIR COMPRESSOR that will economically serve the railroad industry and prove a handy tool in mine, pit and quarry has been announced recently by *Schramm Inc., of West Chester, Pa.* A standard compressor, containing all construction features that the portable compressor embodies, is mounted on a substantial rail car. The same engine that drives the compressor unit propells the outfit by means of chain drive. A decided advantage in the rail car compressor construction is the clutch feature which enables the operator to easily and quickly disconnect the compressor from the engine so that the car may be propelled without wear on the compressor.



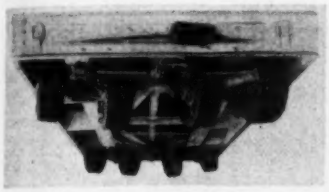
Four sizes are built in gasoline engine drive—120, 180, 240 and 360 cu. ft. displacements. Motor driven outfits can be supplied for operation from power lines. The rail car is equipped with hand brakes, a substantial running board, tool box, and transverse wheels for derailing. Lifting bale for hoisting is supplied as standard equipment. It will operate up to a speed of 20 m.p.h in either forward or reverse.

New Type Heavy-Duty Trailer

A DISTINCTLY NEW type of heavy-duty carry-all trailer has been announced by the *C. R. Jahn Company, 1140 First National Bank Building, Chicago, Illinois.* Manufactured at La Crosse, Wisconsin, it has been named the La Crosse Tu-Way Trailer. Fully reversible, it may be

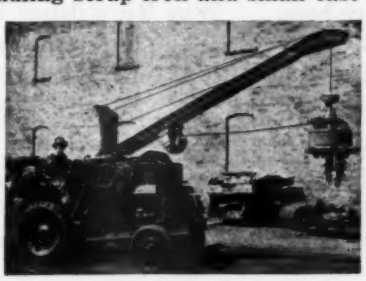
pulled, steered and braked from either end. It is built in capacities of from 10 to 40 tons, and may be used to haul practically any heavy, cumbersome object or material, such as road building machinery, heavy contractors' equipment, structural steel sections, tractors, vaults, etc.

This new unit differs from the conventional type of heavy machinery trailer, according to the manufacturer, in that it eliminates the necessity of a high front deck. Its low platform may be loaded from either end or side. It provides the shortest possible wheel base and all-over length without sacrificing loading space. There are eight wheels, mounted in pairs. The wide flange steel beams making up the main frame members are tapered, permitting axles to be mounted beneath the beam ends, utilizing the full strength of the flange and web. This method of mounting also makes possible free tilting and pivoting action of wheels and axles, so that the trailer maintains the average road level, regardless of road conditions. It will make right-angle turns, following exactly in the track of the truck pulling it, and has an unusually short turning radius. Effective eight-wheel steering and eight-wheel braking is secured, regardless of position the pivoting axles may be in at the time. The trailer is of heavy, rugged construction throughout. Main frame members are so spaced that the load rests directly over them, and the unusually short span between axle centers eliminates the possibility of sagging. For more complete information please write the manufacturer, mentioning the magazine.



Loadmaster Equipped With 20-inch Electro Magnet

THE Loadmaster, manufactured by *Bucyrus-Erie Company, South Milwaukee, Wisconsin,* and mounted on either wheels or crawlers, may now be obtained equipped with 20-inch Ohio magnet. This magnet equipment makes the machine a very useful tool for handling scrap iron and small castings which ordinarily require considerable time for hooking. Since the Loadmaster requires no more space for operation than a small automobile, since it has a full-revolving boom and since it can be used as a tractor, as a crane, or can lift and travel with its load, it fills a long felt want for industrial units whose material handling problem has not warranted the purchase of a larger machine. Power is supplied to the magnet by a 2 K. W. Kohler electric plant, mounted on the truck frame of the crane. Additional information will gladly be supplied by the manufacturer.



Allis-Chalmers Track Wagons

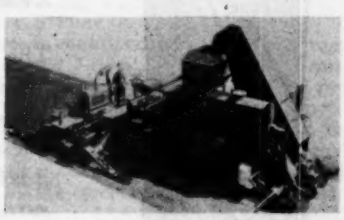
A COMPLETE line of track wagons, including bottom dump, end dump, log, pipe and industrial track wagons, has been added by the *Allis-Chalmers Tractor Division, Milwaukee,* for distribution through the company's track-type tractor dealers.

Four models of bottom dump wagons (see illustration) are being built in 5½, 6, 7 and 8 yard capacities. All are equipped with 15-ton capacity drop-forged tracks and ball-bearing dumping and winding mechanism which is safe, simple and easy to operate. An 8-yard gravity rear end dump wagon for hauling shale or rock and for use in construction of fills where bottom dump wagons cannot be used efficiently is included in the line. It is operated from the tractor seat by rope control and when empty folds back automatically into loading position. A 15-ton log, pipe and industrial track wagon is also offered with or without front carrier. Further information on this line of wagons will gladly be sent on request.

Three Unit Bituminous Paver and Finisher

THE Barber-Greene Bituminous Paver and Finisher is now manufactured as a three unit machine which includes loader, mixing unit and finisher.

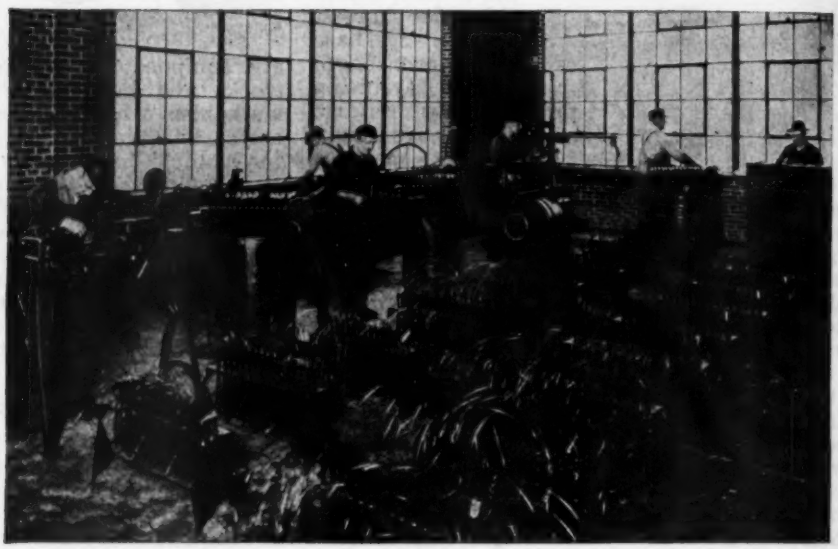
The loader is built for application to a wider range of work on bituminous paving jobs, such as grading, light excavating, loading excess dirt that must be hauled away, stock piling, reclaiming, etc. It has two 400 gallon tanks for oil or asphalt, equipped with heaters, feed pump, etc. The accessories to the loader save the cost and tying up of an expensive distributor.



The mixing unit, when used with the loader, is attached by means of a king pin, being towed on its own or Athey wheels, by the loader. Its equipment includes a pump for spraying oil or asphalt in the spray chamber; aggregate hopper, supplied with gauge to indicate the amount of material therein at all times; calibrated hopper gate and apron feeder to insure accurate volume; and other devices. Having an independent power plant, the mixer may be used as a central plant and is easily portable. It is a complete unit in itself when supplied with charging equipment for either hot or cold mix.

The finisher which spreads, compacts and screeds the mixed material, is practically the same as before. If used separately power driven crawlers may be substituted for rear shoes at the rear end of each evener arm. Complete information on this combination unit may be had by writing *Barber-Greene Co., Aurora, Ill.* Please mention this magazine.

"HERCULES" RED-STRAND REG. U.S. PAT. OFF. WIRE ROPE



A Section of the Leschen testing laboratory, wherein every wire is tested thoroughly to determine its fitness. Any wire that does not come up to our standards in every respect is rejected.

Rigid Tests Maintain the Quality

The uniformly high quality of "HERCULES" (Red Strand) Wire Rope is not a matter of chance or guess, for every wire that goes into it is first rigidly tested by us to make sure that it meets fully our exacting requirements, which have been established after many years of close contact with wire rope working conditions.

In order to have a firm basis on which to build, all "HERCULES" (Red Strand) Wire Rope is made of acid open-hearth steel wire, as acid-steel wire is more uniform and it also offers greater resistance to the wear and tear that is encountered on present day wire rope work.

Wire Rope design is also of great importance, consequently "HERCULES" (Red Strand) Wire Rope is furnished in a wide range of constructions including both Round Strand and Patent Flattened Strand types.

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SHOTS FROM THE FIRING LINE

Records Broken in National Safety Competition

"THE LOWEST accident rates in the past five years were registered during 1931 by 350 mines and quarries competing in the annual National Safety Competition", said W. W. Adams, of the United States Bureau of Mines, in announcing the winners of the competition in the July "Explosives Engineer" magazine, the publication which awards annually the Sentinels of Safety Trophy to the winners of each classification. The competition is conducted by the Bureau of Mines.

Working the greatest number of man-hours in 1931, with the least severe accident rate, in the quarry and open-pit mine class the leader was Mahoning Open Cut Iron Mine, Mahoning Ore & Steel Company, Hibbing, Minnesota with 339,722 man-hours and no accidents.

A complete story of the 1931 competition, together with a list of the 68 plants which operated the entire year without accident, may be obtained by addressing The Explosives Engineer, Wilmington, Delaware.

Gold Mines Most Numerous

GOLD MINING appears to present the most promising field for the employment of graduate mining engineers in the metal-mining industries during the next twenty years, stated Scott Turner, Director of the United States Bureau of Mines, in addressing the graduating class at Michigan College of Mining and Technology, Houghton, Michigan, recently. If relatively low price levels continue, the increasing trend of gold production witnessed in 1930 and 1931 may be expected to continue, said Mr. Turner. This industry has probably supported more engineers than any other branch of mining, as gold mines are more numerous than any other kind.

Stressing the importance of gold in the domestic metal-mining industry, Mr. Turner said that, out of a total of 2,262 deep nonferrous metal mines operating in the United States in a recent year, gold was the principal product in 1932. In addition, there were 1,202 placer-mining operations. So there were 2,134 gold producers out of a total of 3,464 nonferrous metal mines including placers. Lead was the principal product in 479 mines, silver in 333, zinc in 267, and copper in 251 mines. The number of iron mines operating in the United States was 211.

Foreign

China

The 14-mile motor highway being constructed by the Fukien Provincial Government between the Ma Niao Anchorage and the City of Foochow is about three-fourths completed. It is expected to be opened to traffic by the end of 1932. When finished it will greatly facilitate the handling of cargo from the present boat anchorage to the city of Foochow.

Italy

Considerable road improvement is under way or contemplated for 1932 in the Province of Genoa. This includes about 18 miles of new, but semi-permanent paving, on certain old roads, totalling 200,000 square meters, and about 50 miles of permanent new asphalting on highways with a surface of 500,000 square meters.

Japan

Considerable progress is being made on the 22-mile 75-foot-wide loop boulevard, being constructed by the City of Tokyo. It consists of two parallel roads, one inside and the other outside the electric-belt road operated by the Government Railways. It is being constructed without level crossings at main intersections, and when completed will be paved with either asphalt or concrete. Present construction is being carried on as a part of the unemployment relief program of the city.

Sweden

The above illustration on the operations of Krangede Aktiebolag of Stockholm shows a Bucyrus-Erie 42-B electric tunnel shovel commencing its work at the downstream end of the discharge tunnel from an underground power station now under construction by this firm. The dimensions of the tunnel are width 9 meters (29.5 feet), height 12.4 meters (40.6 feet), length 1450 meters (4756 feet). The illustration, however, does not show the full section of the tunnel as the present bottom at the portal is some 5 meters above the finished tunnel bottom. The shovel will enlarge the tunnel as it digs in until the track grade reaches the bottom level of the tunnel. Poles have been used to make a double roof over the shovel to protect the house from fragments of rock thrown in blasting and the rear of the house has also been covered with heavy planking for the same purpose. Electric locomotives are used for hauling the muck cars.

Canada

Montreal and Vicinity

By S. A. STEPHENS, JR.

Good news for motorists is contained in the dispatch from Quebec which states that the 7-mile stretch of road from the Ontario border east to Coteau is to be widened and resurfaced at once. After riding for hundreds of miles on perfect Ontario roads it was, and still is, quite a shock to motorists to crash onto this Quebec road, just at a large sign reading "Welcome to Quebec"—speed limit 30 miles". The work is being done by the **Quebec Paving Co., Limited,** of Montreal and is to cost about $6,000 per mile due to the fact that most of the distance traversed is through the Coteau swamps.

The Federal Government has approved plans for the proposed **Lachine-Caughnawaga Bridge** over the St. Lawrence River. The bridge will carry roadways and sidewalks and will be about 100 feet downstream from the Canadian Pacific Railway's bridge. It is understood that tenders for the $3,000,000 job will be called very shortly. This will give Montreal three large highway bridges to the south shore.

Another road contract of major importance is that held by the **Canadian Good Roads Construction Limited** for the rebuilding and paving of Provincial Highway No. 1 between Granby and Magog, Que. Work has been progressing since the spring and consists of grading, widening, straightening curves, etc. 20-B and B-2 Bucyrus-Eries and a Dominion Gopher are handling the excavating on the job. The contract amounts to $590,309.00.

New England Notes

By C. BRUCE McCOWN

Department of Public Works, Commonwealth of Massachusetts received bids on five road jobs Tuesday, July 12th.

Coleman Brothers, Inc., Boston, were low bidders and were awarded the City of Newton and Town of Wellesley

road. This project is a continuation of the Boston-Worcester turn-pike and the largest job let this year in Massachusetts. This section of the turnpike is 16,994 feet in length and to be concrete and bituminous macadam. The excavation and borrow on this section totals over 300,000 cu. yds.

T. J. McCue Construction Co., Watertown, was low bidder and The Lane Construction Corporation, Meriden, Connecticut second bidder on the Bourne-Falmouth job. This section of road is 34,100 feet in length and to be of bituminous concrete construction. The excavation and borrow total about 200,000 cu. yds.

The New Haven Road Construction Co., of New Haven, was low bidder and was awarded the Lenox-Pittsfield job. The excavation and borrow total about 50,000 cu. yds.

Joseph P. McCabe, Inc., South Boston, was awarded the Town of Arlington job.

James H. Kerr, Boston, was awarded the Dighton-Taunton job. This section is to be bituminous macadam 3,390 ft. in length. Excavation and borrow totals about 25,000 cu. yds.

Wyman & Simpson, Inc., Augusta, Maine, were awarded a job in the Town of Dexter, Maine. The job calls for 1.43 miles of reinforced concrete 20 feet wide. Bid price was $36,275.80.

New York Notes

Lane Construction Corporation of Meriden, Connecticut, was low bidder with $135,592 on the 8.75 miles from Port Ontario-Jefferson County Line in Oswego County.

John Arborio, Incorporated, of Poughkeepsie was low bidder with $168,458, on the 6.94 miles from Masonville to Walton in Delaware County. Also low bidder with $206,820 on the 6.83 miles in Sullivan County from Narrowsburg to Callicoon.

Brescia Strada Contracting Company, Incorporated, of New York City, was low bidder with $245,082 on the 6.11 miles from Narrowsburg to Callicoon in Sullivan County.

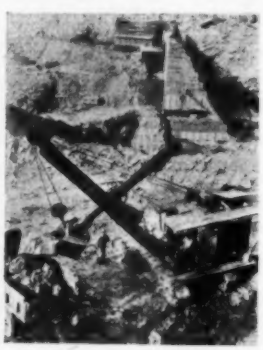
Fred A. Ray of Herkimer was low bidder with $15,066 on the 0.06 mile in Herkimer County from Columbia to Mohawk Highway.

Tyne & Willey, Incorporated, of Binghamton were low bidders with $41,485 on the 0.54 mile in Broome County on Lestershire Road Highway 125.

Richard E. Weber, Incorporated, of Schenectady was low bidder with $61,190 on the 2.96 miles in Franklin County from Dickinson to West Bangor.

Baltimore and Vicinity

By FORD FISHER



The attractive view presented here was taken on the construction operations for **Pretty Boy Dam**. This large project will increase the water supply of Baltimore City. The Bucyrus-Erie Gas+Air in the foreground is working in solid rock but makes light work of the tough digging. The machine is owned by **H. T. Campbell Sons** of Towson, Maryland. This dam was originally started by J. A. LaPorte Corporation of Albany, New York. The project was later taken over by the Arundel Corporation who are completing the job.

Philadelphia and Vicinity

By M. G. CONWAY

Jafolla and Mark expect to clean up South Broad Street Subway about the 15th of August. The subway construction is approximately eighty-five per cent completed and the excavation work entirely completed. They used four Bucyrus-Erie Type 1030 electric tunnel shovels and two Koehring shovels on this job.

L. R. Gilbert of Bound Brook and Plainfield, N. J. has started on a $100,000.00 storm sewer job for Haverford Township in Delaware County, Penna. This job will be supervised by Earl Bell. We welcome Mr. Gilbert and Mr. Bell to our territory.

The Frank Mark Contracting Company of Philadelphia is about to start the north approach to Henry Avenue Bridge using a Bucyrus-Erie Type B machine for this work. **Morrissey Brothers** of Philadelphia are starting on the fill for the approaches to this bridge. They subbed this work from the Union Paving Company and are using a Bucyrus-Erie Type B machine on the work. When this work is completed it will be a short-cut from Chestnut Hill and the suburban points to the center of Philadelphia.

A runway for seaplanes in Cape May, N. J. has been awarded to the **Rendel Corporation** of Chelsea, Mass. This contract was awarded by the Atlantic Coast Guards.

Seeds and Durham of Philadelphia have recently been awarded the construction of a bridge across the Shrewsbury River between Highlands and Seabright, in the County of Monmouth, on State Highway Route No. 36, Section No. 3. The bridge will have a total length of about 1350 feet and will consist of one double leaf bascule span, 140 feet center to center of trunnions and eleven plate girder approach spans.

Francis A. Canuso & Son of Philadelphia have started work on the construction of Route No. 42, Section No. 7, Grenlock to Woods Corner, Camden and Gloucester Counties, New Jersey. This contract consists of approximately fifty thousand yards of excavation. We wish you the best of luck with this contract, Mr. Canuso.

Northeastern Piping & Construction Co., North Tonawanda, N. Y. was low bidder on a heating plant and distributing system in Washington, D. C. Their bid was $840,114. The Fred Snare Corp. of New York City was second low bidder with a bid of $875,000.

The District Commissioners of Washington, D. C. have awarded a contract for Cement Concrete Alleys to **W. F. Brenizer Co.** of Washington, at a price of $91,895.00. Mr. Brenizer is also low bidder on a concrete roadway in Washington. His bid being approximately $149,967.50.

Buffalo and Vicinity

By G. E. PETERSON

The Kingsbury Construction Company of Hudson Falls is putting the finishing touch on the crossing elimination job on Route 22 between Westport and Port Henry. The work was started on November 3, 1931 and called for a subway under the D. & H. R. R. tracks where they cross Route 22. The excavation on the job amounted to 50,000 cubic yards and included about 35,000 cubic yards of rock. This was blasted and the digging was handled with their Bucyrus-Erie Gas+Air shovel. Neil Havens of Glen Falls, N. Y., was behind the levers of the Gas+Air and John Bush was his able oiler.

Besides the excavation, the job called for a steel and concrete span 52 feet long, to carry the D. & H. tracks. The paving on the roadway is Amesite, or Type 4, and amounted to 5,000 square yards. There were also concrete curbs and gutters on both sides of the roadway. During the operations the Gas+Air shovel was used as a clamshell for unloading the Amesite. This was done by simply taking out the dipper handle and using the regular shovel boom and a ½-yard Williams bucket on a single line and tripping it by hand.

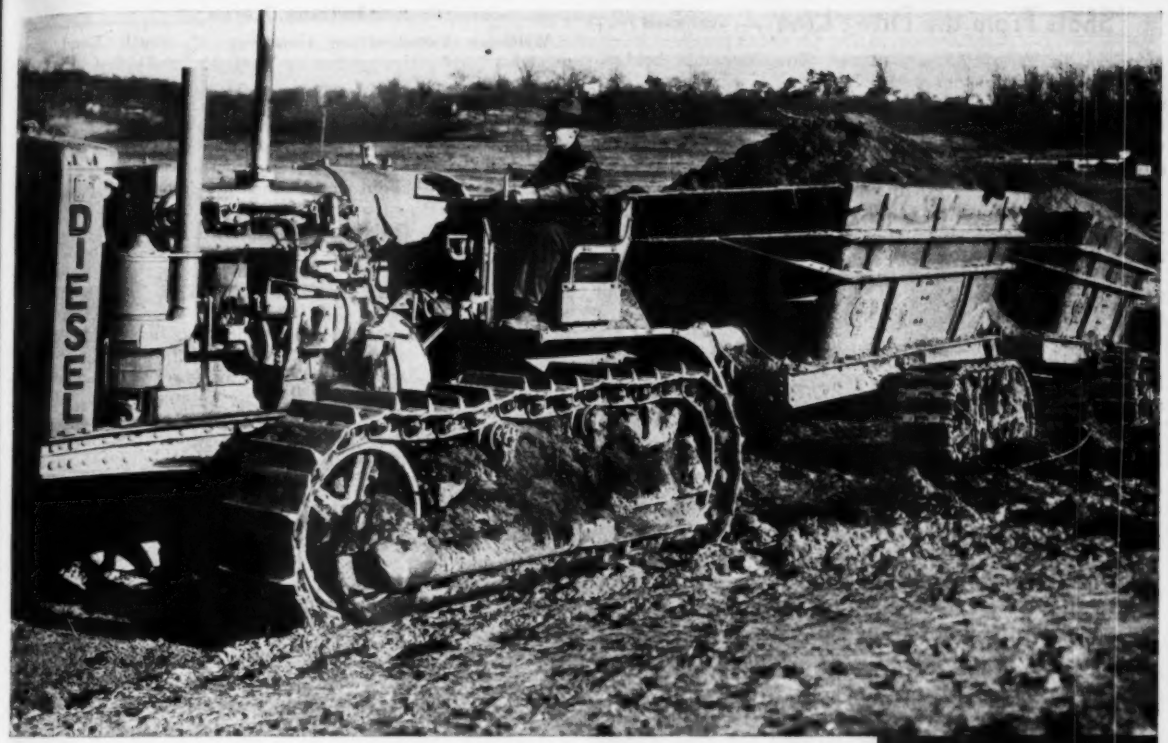
The work was in direct charge of Charles Sexton, Superintendent of the Kingsbury Company. Charles Smith was in charge for the State of New York and W. Crounce represented the D. &. H. R. R. on the job. T. J. Horrigan is President of the Kingsbury Company and M. A. Sheldon is Vice-President.

This job was started in the dead of winter and carried on right thru with only a few days lost on account of bad weather.

The Spellman-Oliver Company of Chateaugay started the concreting on their job between Malone and Chateaugay about July 1st. Gravel is being furnished, for this job by Louis Para & Son of Malone.

The completion of the grain elevator for the Port of Albany has been slightly delayed, but was completed enough to handle a 131,000 bushel cargo of grain which arrived from Buffalo. The final checking up and completion of all jobs occasioned the hold-up.

The Albany County Highway Department has postponed the construction of a 40-foot highway running from the



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FIFTEEN	$1100	THIRTY-FIVE	$2400
TWENTY	$1450	FIFTY	$3675
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DIESEL	$6500		

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TRACTOR

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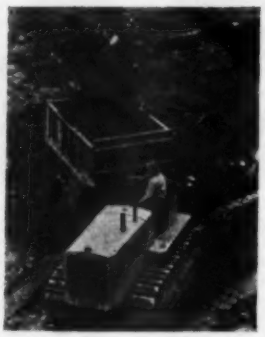
Shots From the Firing Line — *Continued*

northern limits of Albany to the Troy-Menands bridge. The new road is to run parallel to the present Troy road and street car lines, but will be built further east on the old dike of the abandoned canal bed. Economic conditions were given as the reason for the postponement of the construction.

Ohio Notes

Ace Construction Company of Norwood was awarded project number F. A. 149A, 1.881 miles grading on Road 52 in Franklin County for $26,994.

The Department of Highways of Ohio opened bids June 24th for approximately $2,000,000 worth of highway and bridge construction and about $675,000 worth of surface treatment work.



Roy Strowser, Inc., East Columbus, used Caterpillar Fiftys and 8-yard Athey Truss Wheel wagons in hauling from the shovel on the State Highway 127 south of Eaton on a job to eliminate two dangerous grade crossings on the Pennsylvania Railroad, the railroad bearing part of the cost. The Bucyrus-Erie 1¼-yard Gas+Air shovel averaged daily about 1400 yards on a 1,000 foot haul. When the picture was taken the outfit was making a 27-foot cut for a creek channel. Much of the operation was under soft oozy conditions. Where Mr. Strowser's trucks were unable to operate, tractors and crawler wagons came through the mud without trouble.

Bernard Savage of Columbus was awarded contract for highway grading and structures in Monroe County totaling $27,169.

Indiana Notes

Williston Construction Company of South Bend was awarded 7.915 miles paving on Road 31 for $115,863; **Scharl Construction Company**, Grand Rapids, Michigan awarded 7.387 miles grading on Road 47 in Parke County for $48,484.

Indiana bridge contracts awarded recently include **Hill & Leary** of Greenfield contract number 509 for $6,422; **Clark & Duvall** of Flora contract number 513 for $17,687; **Hancock & Kieffer** of Brownstown contract number 517 for $13,566; **W. H. Rupert** of Brazil contract number 519 for $4,024.

W. J. Nees Company of Mishawaka was awarded Project 172B-1, 3.9 miles rock asphalt paving, for $61,514.56 and Project 120B, 4.279 miles rock asphalt pavement for $51,090.42.

Roger Daoust of Defiance, Ohio, was awarded Project 179 B-331A for $33,813.

Great Lakes Dredge & Dock Company of Chicago was awarded dredging of 383,000 cubic yards from Indiana Harbor for $68,940.

Brock & Hasler of Elnora were awarded project number 289A, for 1.521 miles of grading and structures on Road 246 in Owen County for $14,193.

Illinois Notes

A. F. Beckman of Glen Ellyn was awarded the contract for grading section 123A in Fulton County with a bid of $75,500.

F. E. Lefferdink of Springfield was awarded the contract for grading sections 122A and 121A in Brown County and Brown-Pike County with a bid of $79,099.

Central Engineering Company of Davenport, Iowa, was awarded the contract for grading section 105A in Warren-Henderson County with a bid of $38,311.

Lefferdink Construction Company of Springfield was awarded the contract for grading section 106A in Henderson County with a bid of $47,274.

Keeley Brothers Contracting Company of East St. Louis, Illinois was awarded completing of west levee project 12, Millstadt Road in Centreville township for which estimate was $90,000.

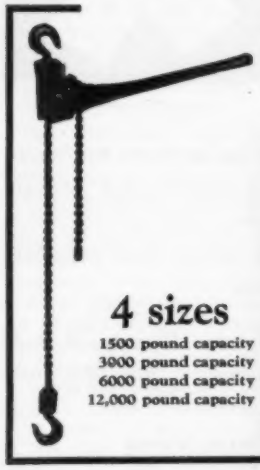
Winston Brothers of Farina, Illinois and St. Louis were awarded contract for elevating and grading several roads bordering on Lake Springfield at Springfield and building culverts and fences. The amount of the contract was $16,005.

In Kankakee County **Triangle Construction Company** of Kankakee was awarded contract for road running west from Grant Park to point two miles distant on bid of $15,740 and **H. J. Shanks Construction Company** of Watseka, was awarded one mile of road north from Irwin for $4,871.

The subway at 19th and Cook Streets in Springfield is assured of construction beginning this fall. The Illinois Central and Baltimore & Ohio Railroads have accepted the latest proposal on division of costs which are expected to total $80,000.

Nelson J. Cole & Sons of Lignonier, Indiana were awarded extension of Upper Salt Fork Drainage project in Cham-

WHEN A LIFT IS NEEDED



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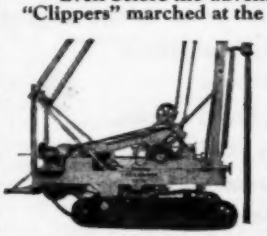

Loomis "Clippers" are the most popular drills because they have earned the distinction.

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This is at once the common-sense and most exacting basis for judging wire rope service cost. It is the basis advocated by Roebling, in which rope cost per ton of material handled, per mile traveled, or per other unit of service measurement, is based not on the service of a single rope but on the *average* service of several ropes.

Roebling Wire Ropes are made to give *uniformly* good service. No wire ropes, regardless of make or construction, will show lower general-average operating costs.

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Roebling does not indulge in nor encourage sweeping claims of superior wire rope economy. Such claims, if generally made, would merely confuse the rope user. ¶ For the guidance of rope buyers, however, Roebling does assert that when gauged by the work performed, NO wire rope, regardless of make or construction, will show lower general average operating costs than Roebling.

Wire Rope for all purposes

The importance of selecting the right rope for each use cannot be too strongly emphasized. For no one rope will meet all requirements. ¶ Roebling makes wire rope of a great variety of types and designs, including Standard Right, Left, Lang, Preformed and Alternate Lays, in all degrees of rope and strand flexibility. ¶ The great stamina of all Roebling Ropes is primarily due to the quality of Roebling Wire. This Acid Steel Wire is renowned for its fatique resisting and wearing qualities. No better rope wire is produced. ¶ "BLUE CENTER" STEEL is the highest grade and is generally recommended for severe duty.

JOHN A. ROEBLING'S SONS COMPANY

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Shots From the Firing Line— *Continued*

paign county at 4.69 cents a yard for dirt removed. The engineer estimates the yardage on this project at 731,341 which would make total of bid $34,300.

Wisconsin Notes
By C. W. HAY

Wm. Lathers, Jr., is just starting his job on the DeSota-Veroqua road. He has 132,000 of earth and loose rock and 14,000 of solid rock to move on 8.3 miles.

A. B. Lynch Company of Milwaukee was recently awarded an 18 mile grading contract on the Hurley-Odanah-Ashland Road in Iron County. Total yardage is 458,000 on bid price of $118,762. Work started about July 15th.

Nelson, Mullen and Nelson of Rhinelander are subbing a section of the above work.

J. O. Legreid of Stoughton has subbed grading on the Reedsburg-Lavalle road on which Quinn Construction Company of Madison is general contractor. Yardage is 124,000 in seven miles.

Colburn-Thurston are starting their new job of 277,000 yards in 10½ miles of highway grading in Sheboygan County. Their headquarters for this job is at Plymouth. The job is subbed from Paul C. Kroeck, Incorporated, general contractors.

Fitzpatrick & Kuenzli of Cumberland are making very good progress on their 100,000 yard overhead approach fill at Camp Douglas. They expect to finish about August 1st and will be looking for a grading subcontract about that time. They are using their Bucyrus-Erie Gas+Air, LaPlant-Choate wagons and Caterpillar tractors on this job.

P. W. Ryan Sons of Janesville are making good progress on their 250,000 yard rock job at Norwalk. 20,000 of the yardage is solid rock. They are using the Bucyrus-Erie 1½-yard 37-B shown above loading to Euclid and Streich wagons hauled by Allis-Chalmers Monarch and Caterpillar tractors; also a P & H 600 and Koehring 301 loading to trucks. A. P. Ryan and Harry Ryan are in charge. The 37-B is working double shifts and is operated by Chas. Goodspeed and Ben Everson.

The Government decided to deepen the West Neebish Channel an additional foot so **Connolly Contracting Company** will be kept busy on excavation for this job till sometime in August. After excavation is completed the cofferdams will be removed. This interesting job, which is being handled under supervision of Superintendent John S. McKee, was described in our May issue.

He: "When I left my last boarding place, the landlady wept."

Landlady: "Well, I won't need to. I always collect the rent in advance."

Father (to youngster, just put in bed): "Now, what are you crying for?"

Son: "I wanna drink."

Father: "So do I; go to sleep."

Minnesota Notes
By C. F. BARTON

The illustration above shows two Bucyrus-Erie GA-3 draglines being operated by **Megarry Brothers** at Bain, Minnesota, on their grading job of 400,000 cubic yards on Minnesota Route 5. They also have a 1-yard Gopher shovel on this same job. Hauling equipment includes International 3-yard trucks and Euclid 5-yard wagons behind Caterpillar tractors. Megarry Brothers were recently awarded an $86,000 surfacing job in North Dakota and will ship some of their equipment on to this job soon. The entire organization is very enthusiastic about the Gas+Airs which have been doing excellent work.

St. Louis and Vicinity
By A. J. KOENIG

Apparent low bidders for placing about 1,150,000 cubic yards of earthwork on the Valley City Drainage and Levee District, Pike County, Illinois are reported officially as follows: Item 1, 444,000 cubic yards, **W. W. Roth** of Monticello, Indiana, $56,832 (12.8 cents a yard); Item 2, **Viking Construction Company** of Chicago, $59,371 for 372,000 yards at 15.96 cents; Item 3, 334,000 cubic yards, **Bilhorn, Bowers & Peters** of St. Louis, $35,070 (10.5 cents a yard). Combination of all three items makes a total for the entire 1,150,000 yards $151,273.

Bids for the construction of approximately $900,000 worth of paving, grading and bridges will be received by the **Illinois State Highway Commission** on July 27th. The work involves about 25 miles of paving, two bridges, 2400 feet of 30-inch concrete storm sewers and a one-half mile grading job of 58,000 cubic yards.

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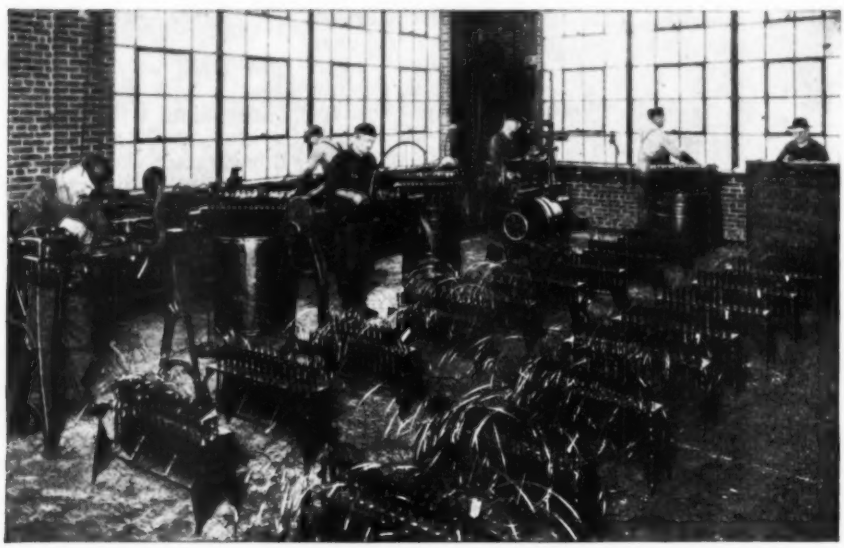
WIRE ROPE



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In order to have a firm basis on which to build, all "HERCULES" (Red Strand) Wire Rope is made of acid open-hearth steel wire, as acid-steel wire is more uniform and it also offers greater resistance to the wear and tear that is encountered on present day wire rope work.

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SHOTS FROM THE FIRING LINE

Records Broken in National Safety Competition

"THE LOWEST accident rates in the past five years were registered during 1931 by 350 mines and quarries competing in the annual National Safety Competition", said W. W. Adams, of the United States Bureau of Mines, in announcing the winners of the competition in the July "Explosives Engineer" magazine, the publication which awards annually the Sentinels of Safety Trophy to the winners of each classification. The competition is conducted by the Bureau of Mines.

Working the greatest number of man-hours in 1931, with the least severe accident rate, in the quarry and open-pit mine class the leader was Mahoning Open Cut Iron Mine, Mahoning Ore & Steel Company, Hibbing, Minnesota with 339,722 man-hours and no accidents.

A complete story of the 1931 competition, together with a list of the 68 plants which operated the entire year without accident, may be obtained by addressing The Explosives Engineer, Wilmington, Delaware.

Gold Mines Most Numerous

GOLD MINING appears to present the most promising field for the employment of graduate mining engineers in the metal-mining industries during the next twenty years, stated Scott Turner, Director of the United States Bureau of Mines, in addressing the graduating class at Michigan College of Mining and Technology, Houghton, Michigan, recently. If relatively low price levels continue, the increasing trend of gold production witnessed in 1930 and 1931 may be expected to continue, said Mr. Turner. This industry has probably supported more engineers than any other branch of mining, as gold mines are more numerous than any other kind.

Stressing the importance of gold in the domestic metal-mining industry, Mr. Turner said that, out of a total of 2,262 deep nonferrous metal mines operating in the United States in a recent year, gold was the principal product in 1932. In addition, there were 1,202 placer-mining operations. So there were 2,134 gold producers out of a total of 3,464 nonferrous metal mines including placers. Lead was the principal product in 479 mines, silver in 333, zinc in 267, and copper in 251 mines. The number of iron mines operating in the United States was 211.

Foreign

China

The 14-mile motor highway being constructed by the Fukien Provincial Government between the Ma Niao Anchorage and the City of Foochow is about three-fourths completed. It is expected to be opened to traffic by the end of 1932. When finished it will greatly facilitate the handling of cargo from the present boat anchorage to the city of Foochow.

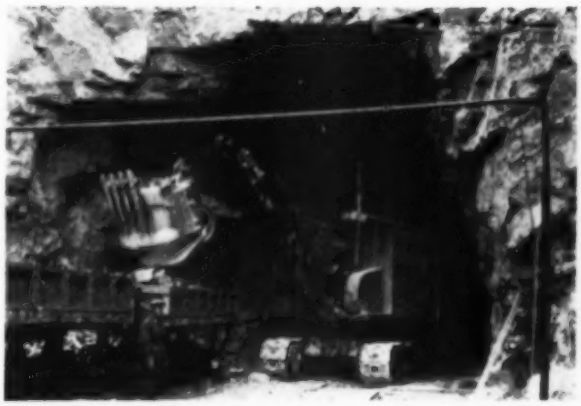
Italy

Considerable road improvement is under way or contemplated for 1932 in the Province of Genoa. This includes about 18 miles of new, but semi-permanent paving, on certain old roads, totalling 200,000 square meters, and about 50 miles of permanent new asphalting on highways with a surface of 500,000 square meters.

Japan

Considerable progress is being made on the 22-mile 75-foot-wide loop boulevard, being constructed by the City of Tokyo. It consists of two parallel roads, one inside and the other outside the electric-belt road operated by the Government Railways. It is being constructed without level crossings at main intersections, and when completed will be paved with either asphalt or concrete. Present construction is being carried on as a part of the unemployment relief program of the city.

Sweden



The above illustration on the operations of **Krangede Aktiebolag** of Stockholm shows a Bucyrus-Erie 42-B electric tunnel shovel commencing its work at the downstream end of the discharge tunnel from an underground power station now under construction by this firm. The dimensions of the tunnel are width 9 meters (29.5 feet), height 12.4 meters (40.6 feet), length 1450 meters (4756 feet). The illustration, however, does not show the full section of the tunnel as the present bottom at the portal is some 5 meters above the finished tunnel bottom. The shovel will enlarge the tunnel as it digs in until the track grade reaches the bottom level of the tunnel. Poles have been used to make a double roof over the shovel to protect the house from fragments of rock thrown in blasting and the rear of the house has also been covered with heavy planking for the same purpose. Electric locomotives are used for hauling the muck cars.

Canada

Montreal and Vicinity

By S. A. STEPHENS, JR.

Good news for motorists is contained in the dispatch from Quebec which states that the 7-mile stretch of road from the Ontario border east to Coteau is to be widened and resurfaced at once. After riding for hundreds of miles on perfect Ontario roads it was, and still is, quite a shock to motorists to crash onto this Quebec road, just at a large sign reading "Welcome to Quebec"—speed limit 30 miles". The work is being done by the **Quebec Paving Co., Limited,** of Montreal and is to cost about $6,000 per mile due to the fact that most of the distance traversed is through the Coteau swamps.

The Federal Government has approved plans for the proposed **Lachine-Caughnawaga Bridge** over the St. Lawrence River. The bridge will carry roadways and sidewalks and will be about 100 feet downstream from the Canadian Pacific Railway's bridge. It is understood that tenders for the $3,000,000 job will be called very shortly. This will give Montreal three large highway bridges to the south shore.

Another road contract of major importance is that held by the **Canadian Good Roads Construction Limited** for the rebuilding and paving of Provincial Highway No. 1 between Granby and Magog, Que. Work has been progressing since the spring and consists of grading, widening, straightening curves, etc. 20-B and B-2 Bucyrus-Eries and a Dominion Gopher are handling the excavating on the job. The contract amounts to $590,309.00.

New England Notes

By C. BRUCE McCOWN

Department of Public Works, Commonwealth of Massachusetts received bids on five road jobs Tuesday, July 12th.

Coleman Brothers, Inc., Boston, were low bidders and were awarded the City of Newton and Town of Wellesley

road. This project is a continuation of the Boston-Worcester turn-pike and the largest job let this year in Massachusetts. This section of the turnpike is 16,994 feet in length and to be concrete and bituminous macadam. The excavation and borrow on this section totals over 300,000 cu. yds.

T. J. McCue Construction Co., Watertown, was low bidder and The Lane Construction Corporation, Meriden, Connecticut second bidder on the Bourne-Falmouth job. This section of road is 34,100 feet in length and to be of bituminous concrete construction. The excavation and borrow total about 200,000 cu. yds.

The New Haven Road Construction Co., of New Haven, was low bidder and was awarded the Lenox-Pittsfield job. The excavation and borrow total about 50,000 cu. yds.

Joseph P. McCabe, Inc., South Boston, was awarded the Town of Arlington job.

James H. Kerr, Boston, was awarded the Dighton-Taunton job. This section is to be bituminous macadam 3,390 ft. in length. Excavation and borrow totals about 25,000 cu. yds.

Wyman & Simpson, Inc., Augusta, Maine, were awarded a job in the Town of Dexter, Maine. The job calls for 1.43 miles of reinforced concrete 20 feet wide. Bid price was $36,275.80.

New York Notes

Lane Construction Corporation of Meriden, Connecticut, was low bidder with $135,592 on the 8.75 miles from Port Ontario-Jefferson County Line in Oswego County.

John Arborio, Incorporated, of Poughkeepsie was low bidder with $168,458, on the 6.94 miles from Masonville to Walton in Delaware County. Also low bidder with $206,820 on the 6.83 miles in Sullivan County from Narrowsburg to Callicoon.

Brescia Strada Contracting Company, Incorporated, of New York City, was low bidder with $245,082 on the 6.11 miles from Narrowsburg to Callicoon in Sullivan County.

Fred A. Ray of Herkimer was low bidder with $15,066 on the 0.06 mile in Herkimer County from Columbia to Mohawk Highway.

Tyne & Willey, Incorporated, of Binghamton were low bidders with $41,485 on the 0.54 mile in Broome County on Lestershire Road Highway 125.

Richard E. Weber, Incorporated, of Schenectady was low bidder with $61,190 on the 2.96 miles in Franklin County from Dickinson to West Bangor.

Baltimore and Vicinity

By FORD FISHER

The attractive view presented here was taken on the construction operations for **Pretty Boy Dam.** This large project will increase the water supply of Baltimore City. The Bucyrus-Erie Gas+Air in the foreground is working in solid rock but makes light work of the tough digging. The machine is owned by **H. T. Campbell Sons** of Towson, Maryland. This dam was originally started by J. A. LaPorte Corporation of Albany, New York. The project was later taken over by the Arundel Corporation who are completing the job.

Philadelphia and Vicinity

By M. G. CONWAY

Jafolla and Mark expect to clean up South Broad Street Subway about the 15th of August. The subway construction is approximately eighty-five per cent completed and the excavation work entirely completed. They used four Bucyrus-Erie Type 1030 electric tunnel shovels and two Koehring shovels on this job.

L. R. Gilbert of Bound Brook and Plainfield, N. J. has started on a $100,000.00 storm sewer job for Haverford Township in Delaware County, Penna. This job will be supervised by Earl Bell. We welcome Mr. Gilbert and Mr. Bell to our territory.

The Frank Mark Contracting Company of Philadelphia is about to start the north approach to Henry Avenue Bridge using a Bucyrus-Erie Type B machine for this work. **Morrissey Brothers** of Philadelphia are starting on the fill for the approaches to this bridge. They subbed this work from the Union Paving Company and are using a Bucyrus-Erie Type B machine on the work. When this work is completed it will be a short-cut from Chestnut Hill and the suburban points to the center of Philadelphia.

A runway for seaplanes in Cape May, N. J. has been awarded to the **Rendel Corporation** of Chelsea, Mass. This contract was awarded by the Atlantic Coast Guards.

Seeds and Durham of Philadelphia have recently been awarded the construction of a bridge across the Shrewsbury River between Highlands and Seabright, in the County of Monmouth, on State Highway Route No. 36, Section No. 3. The bridge will have a total length of about 1350 feet and will consist of one double leaf bascule span, 140 feet center to center of trunnions and eleven plate girder approach spans.

Francis A. Canuso & Son of Philadelphia have started work on the construction of Route No. 42, Section No. 7, Grenlock to Woods Corner, Camden and Gloucester Counties, New Jersey. This contract consists of approximately fifty thousand yards of excavation. We wish you the best of luck with this contract, Mr. Canuso.

Northeastern Piping & Construction Co., North Tonawanda, N. Y. was low bidder on a heating plant and distributing system in Washington, D. C. Their bid was $840,114. The Fred Snare Corp. of New York City was second low bidder with a bid of $875,000.

The District Commissioners of Washington, D. C. have awarded a contract for Cement Concrete Alleys to **W. F. Brenizer Co.** of Washington, at a price of $91,895.00. Mr. Brenizer is also low bidder on a concrete roadway in Washington. His bid being approximately $149,967.50.

Buffalo and Vicinity

By G. E. PETERSON

The Kingsbury Construction Company of Hudson Falls is putting the finishing touch on the crossing elimination job on Route 22 between Westport and Port Henry. The work was started on November 3, 1931 and called for a subway under the D. & H. R. R. tracks where they cross Route 22. The excavation on the job amounted to 50,000 cubic yards and included about 35,000 cubic yards of rock. This was blasted and the digging was handled with their Bucyrus-Erie Gas+Air shovel. Neil Havens of Glen Falls, N. Y., was behind the levers of the Gas+Air and John Bush was his able oiler.

Besides the excavation, the job called for a steel and concrete span 52 feet long, to carry the D. & H. tracks. The paving on the roadway is Amesite, or Type 4, and amounted to 5,000 square yards. There were also concrete curbs and gutters on both sides of the roadway. During the operations the Gas+Air shovel was used as a clamshell for unloading the Amesite. This was done by simply taking out the dipper handle and using the regular shovel boom and a ½-yard Williams bucket on a single line and tripping it by hand.

The work was in direct charge of Charles Sexton, Superintendent of the Kingsbury Company. Charles Smith was in charge for the State of New York and W. Crounce represented the D. &. H. R. R. on the job. T. J. Horrigan is President of the Kingsbury Company and M. A. Sheldon is Vice-President.

This job was started in the dead of winter and carried on right thru with only a few days lost on account of bad weather.

The Spellman-Oliver Company of Chateaugay started the concreting on their job between Malone and Chateaugay about July 1st. Gravel is being furnished, for this job by Louis Para & Son of Malone.

The completion of the grain elevator for the Port of Albany has been slightly delayed, but was completed enough to handle a 131,000 bushel cargo of grain which arrived from Buffalo. The final checking up and completion of all jobs occasioned the hold-up.

The Albany County Highway Department has postponed the construction of a 40-foot highway running from the

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Shots From the Firing Line — *Continued*

northern limits of Albany to the Troy-Menands bridge. The new road is to run parallel to the present Troy road and street car lines, but will be built further east on the old dike of the abandoned canal bed. Economic conditions were given as the reason for the postponement of the construction.

Ohio Notes

Ace Construction Company of Norwood was awarded project number F. A. 149A, 1.881 miles grading on Road 52 in Franklin County for $26,994.

The Department of Highways of Ohio opened bids June 24th for approximately $2,000,000 worth of highway and bridge construction and about $675,000 worth of surface treatment work.

Roy Strowser, Inc., East Columbus, used Caterpillar Fiftys and 8-yard Athey Truss Wheel wagons in hauling from the shovel on the State Highway 127 south of Eaton on a job to eliminate two dangerous grade crossings on the Pennsylvania Railroad, the railroad bearing part of the cost. The Bucyrus-Erie 1¼-yard Gas+Air shovel averaged daily about 1400 yards on a 1,000 foot haul. When the picture was taken the outfit was making a 27-foot cut for a creek channel. Much of the operation was under soft oozy conditions. Where Mr. Strowser's trucks were unable to operate, tractors and crawler wagons came through the mud without trouble.

Bernard Savage of Columbus was awarded contract for highway grading and structures in Monroe County totaling $27,169.

Indiana Notes

Williston Construction Company of South Bend was awarded 7.915 miles paving on Road 31 for $115,863; **Scharl Construction Company**, Grand Rapids, Michigan awarded 7.387 miles grading on Road 47 in Parke County for $48,484.

Indiana bridge contracts awarded recently include **Hill & Leary** of Greenfield contract number 509 for $6,422; **Clark & Duvall** of Flora contract number 513 for $17,687; **Hancock & Kieffer** of Brownstown contract number 517 for $13,586; **W. H. Rupert** of Brazil contract number 519 for $4,024.

W. J. Nees Company of Mishawaka was awarded Project 172B-1, 3.9 miles rock asphalt paving, for $61,514.56 and Project 120B, 4.279 miles rock asphalt pavement for $51,090.42.

Roger Daoust of Defiance, Ohio, was awarded Project 179 B-331A for $33,813.

Great Lakes Dredge & Dock Company of Chicago was awarded dredging of 383,000 cubic yards from Indiana Harbor for $68,940.

Brock & Hasler of Elnora were awarded project number 289A, for 1.521 miles of grading and structures on Road 246 in Owen County for $14,193.

Illinois Notes

A. F. Beckman of Glen Ellyn was awarded the contract for grading section 123A in Fulton County with a bid of $75,500.

F. E. Lefferdink of Springfield was awarded the contract for grading sections 122A and 121A in Brown County and Brown-Pike County with a bid of $79,099.

Central Engineering Company of Davenport, Iowa, was awarded the contract for grading section 105A in Warren-Henderson County with a bid of $38,311.

Lefferdink Construction Company of Springfield was awarded the contract for grading section 106A in Henderson County with a bid of $47,274.

Keeley Brothers Contracting Company of East St. Louis, Illinois was awarded completing of west levee project 12, Millstadt Road in Centreville township for which estimate was $90,000.

Winston Brothers of Farina, Illinois and St. Louis were awarded contract for elevating and grading several roads bordering on Lake Springfield at Springfield and building culverts and fences. The amount of the contract was $16,005.

In Kankakee County **Triangle Construction Company** of Kankakee was awarded contract for road running west from Grant Park to point two miles distant on bid of $15,740 and **H. J. Shanks Construction Company** of Watseka, was awarded one mile of road north from Irwin for $4,871.

The subway at 19th and Cook Streets in Springfield is assured of construction beginning this fall. The Illinois Central and Baltimore & Ohio Railroads have accepted the latest proposal on division of costs which are expected to total $80,000.

Nelson J. Cole & Sons of Lignonier, Indiana were awarded extension of Upper Salt Fork Drainage project in Cham-

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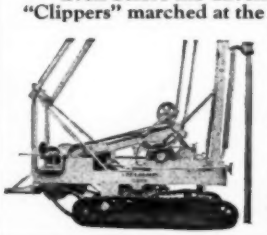

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Shots From the Firing Line— *Continued*

paign county at 4.69 cents a yard for dirt removed. The engineer estimates the yardage on this project at 731,341 which would make total of bid $34,300.

Wisconsin Notes
By C. W. HAY

Wm. Lathers, Jr., is just starting his job on the DeSota-Veroqua road. He has 132,000 of earth and loose rock and 14,000 of solid rock to move on 8.3 miles.

A. B. Lynch Company of Milwaukee was recently awarded an 18 mile grading contract on the Hurley-Odanah-Ashland Road in Iron County. Total yardage is 458,000 on bid price of $118,762. Work started about July 15th.

Nelson, Mullen and Nelson of Rhinelander are subbing a section of the above work.

J. O. Legreid of Stoughton has subbed grading on the Reedsburg-Lavalle road on which Quinn Construction Company of Madison is general contractor. Yardage is 124,000 in seven miles.

Colburn-Thurston are starting their new job of 277,000 yards in 10½ miles of highway grading in Sheboygan County. Their headquarters for this job is at Plymouth. The job is subbed from Paul C. Kroeck, Incorporated, general contractors.

Fitzpatrick & Kuenzli of Cumberland are making very good progress on their 100,000 yard overhead approach fill at Camp Douglas. They expect to finish about August 1st and will be looking for a grading subcontract about that time. They are using their Bucyrus-Erie Gas+Air, LaPlant-Choate wagons and Caterpillar tractors on this job.

P. W. Ryan Sons of Janesville are making good progress on their 250,000 yard rock job at Norwalk. 20,000 of the yardage is solid rock. They are using the Bucyrus-Erie 1½-yard 37-B shown above loading to Euclid and Streich wagons hauled by Allis-Chalmers Monarch and Caterpillar tractors; also a P & H 600 and Koehring 301 loading to trucks. A. P. Ryan and Harry Ryan are in charge. The 37-B is working double shifts and is operated by Chas. Goodspeed and Ben Everson.

The Government decided to deepen the West Neebish Channel an additional foot so **Connolly Contracting Company** will be kept busy on excavation for this job till sometime in August. After excavation is completed the cofferdams will be removed. This interesting job, which is being handled under supervision of Superintendent John S. McKee, was described in our May issue.

He: "When I left my last boarding place, the landlady wept."

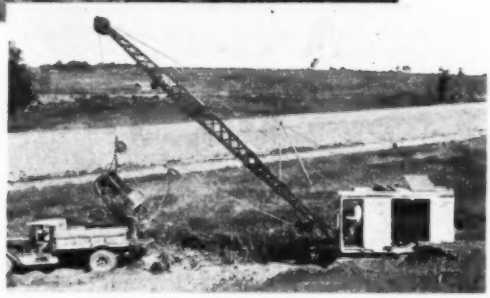
Landlady: "Well, I won't need to. I always collect the rent in advance."

Father (to youngster, just put in bed): "Now, what are you crying for?"

Son: "I wanna drink."

Father: "So do I; go to sleep."

Minnesota Notes
By C. F. BARTON



The illustration above shows two Bucyrus-Erie GA-3 draglines being operated by **Megarry Brothers** at Bain, Minnesota, on their grading job of 400,000 cubic yards on Minnesota Route 5. They also have a 1-yard Gopher shovel on this same job. Hauling equipment includes International 3-yard trucks and Euclid 5-yard wagons behind Caterpillar tractors. Megarry Brothers were recently awarded an $86,000 surfacing job in North Dakota and will ship some of their equipment on to this job soon. The entire organization is very enthusiastic about the Gas+Airs which have been doing excellent work.

St. Louis and Vicinity
By A. J. KOENIG

Apparent low bidders for placing about 1,150,000 cubic yards of earthwork on the Valley City Drainage and Levee District, Pike County, Illinois are reported officially as follows: Item 1, 444,000 cubic yards, **W. W. Roth** of Monticello, Indiana, $56,832 (12.8 cents a yard); Item 2, **Viking Construction Company** of Chicago, $59,371 for 372,000 yards at 15.96 cents; Item 3, 334,000 cubic yards, **Bilhorn, Bowers & Peters** of St. Louis, $35,070 (10.5 cents a yard). Combination of all three items makes a total for the entire 1,150,000 yards $151,273.

Bids for the construction of approximately $900,000 worth of paving, grading and bridges will be received by the **Illinois State Highway Commission** on July 27th. The work involves about 25 miles of paving, two bridges, 2400 feet of 30-inch concrete storm sewers and a one-half mile grading job of 58,000 cubic yards.

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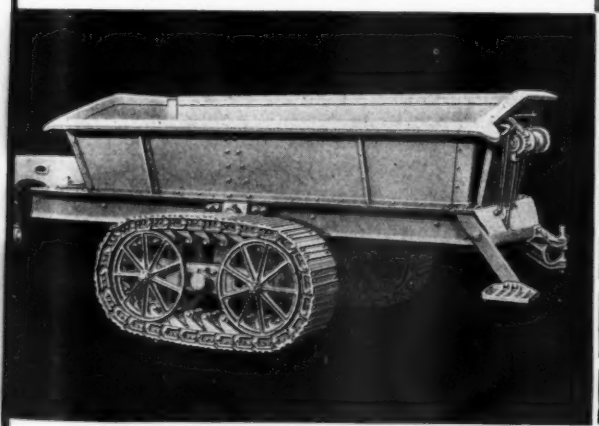

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Shots From the Firing Line — *Continued*

McCarthy Construction Company, of Davenport, Iowa, was low bidder for the resurfacing with brick of 15½ miles of roadway in Sangamon county, Illinois, with a bid of $399,000. Hartman, Clark Bros. were second low with a bid of $412,584.

A new low supplemental bid of $108,184 for the substructure of the new Federal building at 12th and Market streets in St. Louis was submitted by **Samuel Krause Company**. The Excavating and Foundation Co. was second low with a bid of $126,770 and Wm. McDonald Co. was next with a bid of $158,428. All the above are St. Louis firms. This is the second letting for this job as all former bids were rejected. Samuel Krause Company was low at the first letting and was the only company to increase its bid. Their original bid being $98,440.

Stiers Bros. of St. Louis has contract for a sewer in Washington, Mo.

The Board of Public Service, St. Louis, has preliminary plans for seven sewer projects involving an expenditure of approximately $420,000. W. W. Horner, chief engineer, City Hall.

Smith-Cooke Construction Company, St. Louis, has contract for a pedestrian underpass under Market St. at Twelfth Blvd.

Keely Bros. Construction Company, East St. Louis, were awarded contract for completing Project 12, west side levee in Centerville Township, St. Clair county, Illinois.

The City of St. Louis has asked for bids July 26th for the construction of the South Valley approach to the railroad deck of the Municipal (Free) bridge, including southerly double-track connection between eastern railroad approach to bridge and Illinois Transfer Railroad at 21st street in East St. Louis.

A. A. Davis, Oklahoma City, has contract for grading and paving 6.73 miles on Courtney road in Jackson county, Mo.

W. A. Ross Construction Company was awarded contract for paving and grading 3.75 miles on Sterling road in Kansas City.

Skrainka Construction Company, St. Louis, with a bid of $83,458, was low for grading and paving 3 miles of 20-foot concrete road on Tesson Ferry road, St. Louis county.

Wm. A. Riley Construction Company, St. Louis, was low for the construction of 4.26 miles of 20-foot reinforced concrete pavement on Clayton Road, St. Louis county, with a bid of $102,927.

Winston Bros. Co., St. Louis, on their bid of $16,005 was awarded contract for the grading, road elevation and fences around Lake Springfield.

On their bid of $382,893, **Lund & Sager Company** of St. Louis was awarded contract for the construction of 26 miles of concrete highway in Jackson and Union counties, Illinois.

F. E. Lefferdink, Springfield, Ill., was awarded two nice grading jobs in Brown and Pike counties, Illinois.

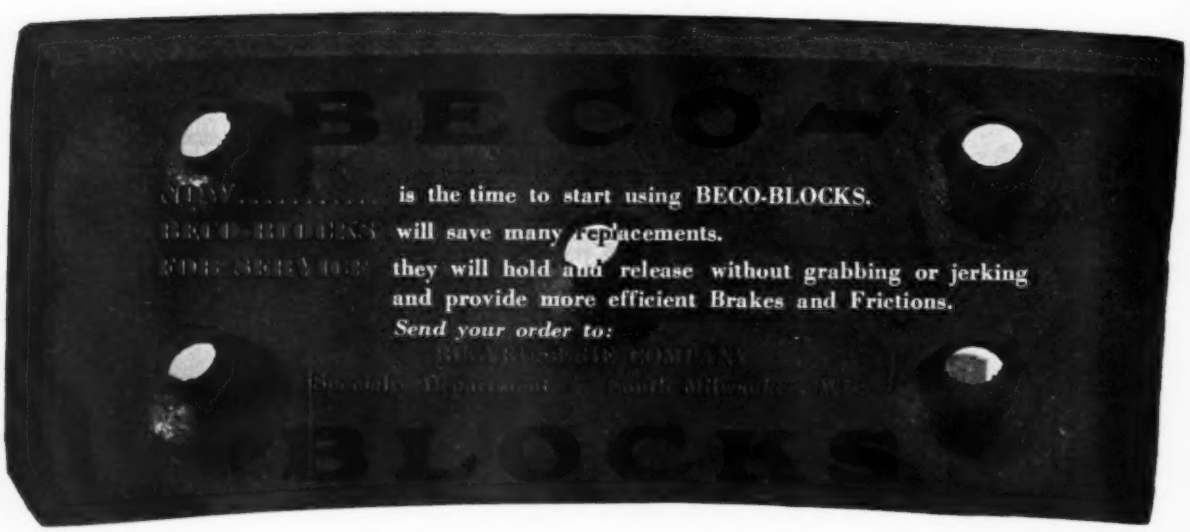
Massman Construction Company, Kansas City, was low bidder for the construction of 2100 feet crib dikes and 4800 ft. clump dikes in Hinkles bend, Missouri River.

C. H. Atkinson Paving Company, Incorporated, has moved their Diamond, Missouri office to Tina, Missouri.

River Notes

By W. W. WHORLEY

Approximately 4,000,000 yards of levee work was let by the Second New Orleans District Office at New Orleans on June 20th. Low bidders were: **Dameron & Kenyon** of Port Allen, La., Harris Ferry section of 505,000 cubic yards; **Ben Flynn** of Alexandria, La., Ryland section of 315,000 cubic yards; **Boone & Wester** of Helena, Ark., Choctaw section of 521,000 cubic yards; **O. M. New** of Little Rock, Ark., Dupre section of 757,000 cubic yards; **J. D. Burnett** of Alexandria, La., Richardson, Gillott and Mondla sections of 767,000 cubic yards; **Lower Coast Construction Company** of New Orleans, Pelican, Speranza, Good Hope, Kenner, Oaklawn sections of approximately 1,000,000 cubic yards.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Shots From the Firing Line — *Continued*

Arkansas Notes

L. E. Harris of West Memphis was awarded 40,700 cubic yards earthwork in the White River Levee district for $6,512.

Colorado Notes

The Interstate Commerce Commission has served notice on the Denver & Rio Grande Western that it must commence construction of the Dotsero Cutoff by September 15th. There is still argument on this point, but it looks as if work on this project may be getting underway before long.

Nevada Notes

J. N. Tedford, of Fallon was awarded contract for reconstructing portion of the State Highway System in Lander County between Railroad Pass and Austin. Amount of bid was $84,376.

Dodge Brothers, Incorporated of Fallon, were awarded contract on bid of $22,877 for portion of the State Highway System in Clark County, between Las Vegas and Boulder City.

Wheelwright Construction Company of Ely, was awarded contract on bid of $16,502 for reconstructing that portion of the State Highway System in White Pine County, between West Foot and East Foot of Conner's Pass.

J. N. Tedford of Fallon with a bid of $2963 was awarded the contract for reconstruction of that portion of the State Highway System in Lyon County, between Wilson's and Mouth of Wilson Canyon.

Dodge Brothers, Incorporated, of Fallon with a bid of $14,002 were awarded the contract for constructing portion of the State Highway System in Washoe County, between Brown's and foot of Geiger Grade.

Oregon Notes

The Portland Sand and Gravel Company of Portland with a bid of $18,737 was awarded the contract for surfacing 11.03 miles with screened gravel from Scottsburg-Paradise Creek Section on the Umpqua Highway.

Dunn & Baker of Klamath Falls were awarded the contract for paving 1.72 miles and rock surfacing 0.32 mile from Terminal City-Klamath Falls Section on the Dalles-California Highway with their bid of $54,525.

J. C. Compton of McMinnvile with a bid of $66,776 was awarded the contract for pavement widening and resurfacing 19.3 miles and 2.0 miles of nonskid surface treatment on Bituminous Macadam Project No. 12, on the Pacific and West Side Pacific Highways.

Theo. Arenz of Portland was awarded contract with his bid of $50,905 for paving 1.63 miles and gravel surfacing 0.57 mile from Kilchis-River to Tillamook section on the Oregon Coast Highway.

Odom & DuRette of Salem was awarded contract for a bridge over the Abernethy Creek on the East Portland-Oregon City Highway at Oregon City with their bid of $25,391.

C. J. Montag of Portland with his bid of $40,845 was awarded the contract for 17 bridges on the Cheshire-Prairie Road Section of the Siuslaw Highway.

Washington Notes

Ray Lyman Wilbur, Secretary of the Interior, on a recent trip visited Spokane, from which point he inspected the various elements that contribute to the proposed great Columbia Basin reclamation project. From there he went to Ellensburg, visiting the Kittitas division of the Yakima reclamation project which is just now nearing completion. From Ellensburg, he went to Nyssa, Oregon near which point is located the Owyhee reclamation dam. The recent completion of that dam was celebrated upon his arrival there on July 17th. The Secretary was accompanied by Mrs. Wilbur.

Concrete paving jobs of about 3.3 miles of State Road No. 3, Spokane to Whitworth, and about 4.6 miles of State Road No. 6, Junction State Road No. 3 to Peone Creek both in Spokane County were awarded to **Norris Brothers** of Burlington for $199,816.

Contract for grading about 2.4 mile of the Asotin-Oregon State Line Road, Anatone South, Section 3 in Asotin County, involving about 15.6 acres of clearing, 138,730 cubic yards of excavation, 2,265 lineal feet of pipe culverts and other items was awarded to **F. H. Deatley & Company,** Lewiston, Idaho for $59,725.

California Notes

By H. L. Livingston

San Gabriel Canyon in Southern California is at the present time the scene of the busiest construction activity in California. **The Bent-Winston Company** is pushing construction on the Pine Canyon Dam project and excavating for the damsite with two Bucyrus-Erie Model 50-B Diesel shovels. **The Macco-Lewis Company** has San Gabriel Dam No. 2 job well under way, the excavation for this dam having already been completed. They now have a Bucyrus-Erie 4-yard Model 120-B electric shovel and a 52-B Bucyrus-Erie Diesel shovel loading out rock from their quarry for the dam. In addition to this a Bucyrus-Erie Diesel+Air shovel is building the necessary roads around the damsite. By the time this is published the **Guy F. Atkinson Company** will have commenced operations on their 7½ mile of highway into San Gabriel Dam No. 1 which will involve the excavation of 1,800,000 cubic yards of highway excavation. Bids on San Gabriel Dam No. 1 will be opened August 1st and as it is estimated that this will be at least a $10,000,000 job, further equipment in addition to the above will soon be moving into San Gabriel Canyon.

The Griffith Company of Los Angeles, who bid $290,932 was low bidder to the California Division of Highways for six miles of grading and concrete paving in Los Angeles County from Barranca Street to Pomona. The excavation on this job amounts to 521,000 cubic yards.

Chas. Harlowe, Jr., has completed about 50% of his highway job leading into the Yosemite Valley in five weeks of double-shift work having moved about 80,000 yards of ma-

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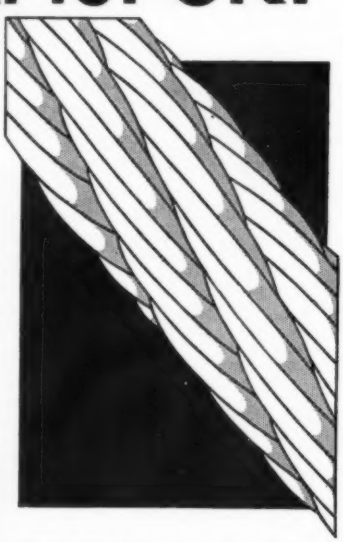
Day in and day out you'll find this rope giving more uniformly superior service than ropes which claim wild statements of service in the attempt to justify their increased cost.



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Modern wire rope blocks made the way · blocks should be made.

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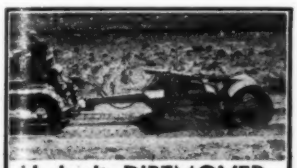
Contractors who are using this NEW Blaw-Knox digging bucket are unanimous in their endorsement of its better and faster digging qualities, its freedom from breakdowns, its sheer ability to dig and handle anything that can be handled by a clamshell. The operating cost is low — lower than you would expect. If dirt moving at lower cost interests you at all,

MAIL THE COUPON—YOU WILL NOT BE OBLIGATED IN ANY WAY



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Please send me the following catalogs:
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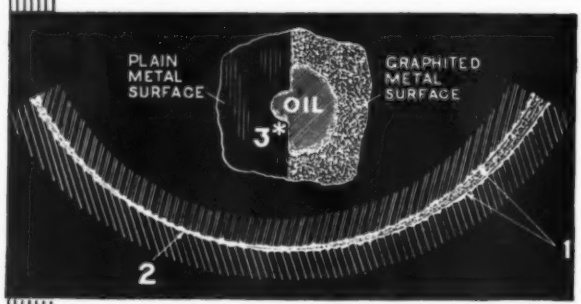

1 GREDAG, a blend of high quality grease and Acheson electric furnace graphite, develops highly polished bearing surfaces, with PURE graphite equalizing the microscopic irregularities of the metal surfaces.

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This film resists pressure, heat and water. It withstands slow speeds and heavy shocks. It prevents rust on water-cooled or weather-exposed bearings.

★ TRY THIS SIMPLE EXPERIMENT on a smooth metal surface with a lead pencil and a drop of oil. It demonstrates the reason for the superiority of Gredag Lubrication.

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Shots From the Firing Line — *Continued*

terial in this time. His work is being handled with a Bucyrus-Erie 37-B gasoline shovel and LeTourneau scrapers.

The Contulous Construction Company of San Francisco was low bidder to the U. S. Bureau of Public Roads for 2.88 miles of grading in Sequoia National Park amounting to 126,000 cu. yds. of excavation.

The Guy F. Atkinson Company of San Francisco, who is constructing a breakwater at Monterey for the U. S. Government, has had an extension of four hundred feet added to their contract which will greatly increase their yardage. Material for this job is being excavated from their quarry in Monterey by a Bucyrus-Erie 50-B Diesel shovel and a Model 208 P&H.

By D. BANKER

Willets and Dempsey, Long Beach contractors, were busy the first two weeks of July excavating for the $25,000 California state armory building being erected at Park avenue and 6th street, Pomona. Ground-breaking ceremonies were held on July 5. Louis Geisler of Huntington Park holds the general contract for the building, which is to be completed for occupancy by the latter part of October.

By H. E. URIDGE

Bucyrus-Erie is seen attending school at the University of California. This 1030 Clamshell with F. E. Taylor at the controls, is finishing up on the big gymnasium and athletic field at that institution. In addition to the 1030, **J. Catucci,** who held the contract, used two Bucyrus-Erie Gas+Air shovels in handling approximately 50,000 yards on the job. It was necessary for the regents to purchase four square blocks of solidly built-up property, and raze all these structures, consisting mainly of dwellings, in order to carry out the project.

TRADE NOTES

LaPlant-Choate Manufacturing Company, Cedar Rapids, Iowa, has recently acquired the license to manufacture Automatic Roll-Over Scrapers under the Reynolds patents Nos. 1642826 and 183339.

The Lincoln Electric Company, of Cleveland, Ohio, has announced the appointment of the Great Northern Tool and Supply Company as distributors for Lincoln products in Montana and Wyoming.

American Steel & Wire Company, a sudsidiary of the United States Steel Corporation, recently opened a new Chicago warehouse, located at 2364 South Ashland Avenue, which supplants the old Lake Street location.

The American Cable Company announced recently that the **Macwhyte Company, Kenosha, Wisconsin,** had been licensed to manufacture preformed wire rope under the American Cable Company's patents.

According to an announcement by **Sterling Motor Truck Company, Milwaukee, Wisconsin,** that company has acquired the motor truck division of La France-Republic Sales Cor-

(Continued on page 406)

For your convenience in writing to National Carbon Company, Inc., you will find a card bound in this issue.

FAST CRANE SERVICE

plus!

The Loadmaster opens new avenues to economy wherever loads must be lifted, carried, or hauled. But its uses are not limited to fast crane service alone. Look over the special equipment that increases its wide range of cost reducing utility.

- **A front end winch for hoisting concrete, handling a dragline scraper, operating a drop hammer, pulling stumps.**
- **Air compressor for operating paving breakers, riveting hammers, and other air tools.**
- **Clamshell bucket for handling bulk materials or occasional excavation.**
- **Bulldozer for grading or cleaning up stock piles.**
- **Magnet for picking up iron and steel.**

Other features include choice of wheel or crawler mounting, special counterweights for increased stability, a water muffler eliminating fire hazard, starter and lighting equipment, detachable grouters, wire rope slings. For complete information write Bucyrus-Erie Company, South Milwaukee, Wisconsin.

BUCYRUS ERIE LOADMASTER

LIFTING CRANE
Rated 4500 pounds, traveling speeds to 10.98 miles per hour.
WINCH
Single or double-drum winch up to 12,500-pound line pull.
BULLDOZER
88x35-inch blade with reversible cutting edge.

For your convenience in writing to Bucyrus-Erie Company you will find a card bound in this issue.

TRADE NOTES *(Continued)*

poration, Alma, Michigan. Both the La France-Republic line of medium and light capacity trucks and the Sterling line of heavy duty trucks will be continued, according to E. M. Sternberg, President of Sterling Motor Truck Company. The combination of the La France-Republic dealer organization with the Sterling factory owned branches will constitute a substantial sales and service organization for both lines.

The Linde Air Products Company, 30 East 42nd Street, New York, recently announced substantial reductions in the prices of Oxweld welding and cutting blowpipes.

R. C. Larkin Company, 3900 South Wabash Ave., Chicago, has been appointed **Allis-Chalmers** dealer in the Chicago territory to succeed the G. E. Hillsman Company. Track and wheel-type tractors, including the Model "L," "35" and "50," road graders, track-type wagons and other Allis-Chalmers products will be handled.

Announcement has recently been made of the appointment June 1st of **Merrill G. Baker** as executive assistant to Albert C. Lehman, president of **Blaw-Knox Company, Pittsburgh.** Mr. Baker was associated for several years with Ford, Bacon & Davis, Inc., engineers, New York, as assistant to the vice-president. Prior to this he was vice-president and director of Vanadium Corporation of America and president of the American International Steel Corporation. From college he went to Cambria Steel Company, resigning as assistant general sales manager to accept a similar position with American Vanadium Company. This was followed by war service and the positions mentioned above.

Nordberg Mfg. Co., Milwaukee, recently announced the removal of their New York and Los Angeles offices to new locations. The New York office is now located at Lincoln Building, 60 East 42nd Street, New York, N. Y., and the Los Angeles office has moved to new quarters at Subway Terminal Bldg., 417 South Hill Street, Los Angeles, Calif.

BOOK REVIEWS

Three papers presented at the annual meeting of The Association of Asphalt Paving Technologists, Detroit, January 14, 1932, have been prepared for distribution by The Asphalt Institute, 801 Second Avenue, New York, N. Y. The title and authors of these papers are: **Adhesion Tension in Asphalt Pavements, Its Significance and Methods Applicable in its Determination** by Victor Nicholson, Engineering Chemist, Bureau of Streets, Department of Public Works, Chicago; **Progress Report on Co-operative Simplification of Tests and Specifications for Liquid Asphaltic Materials** by J. T. Pauls, Senior Highway Engineer, U. S. Bureau of Public Roads, Washington, D. C.; and **Asphalt, Its Chemistry, Significance of Source and Effect of Modern Processes on Present Day Specifications** by C. M. Baskin, Asphalt Technologist, Imperial Oil Refineries, Ltd., Montreal, Que., Canada. For information in regard to securing one or more of these papers, please address the Asphalt Institute.

The Cardinal Reasons Why You Save Money with Tru-Lay is the title of an attractive booklet on Tru-Lay Preformed Wire Rope published by **American Cable Company, 230 Park Avenue, New York, N. Y.** The title is not misleading; twelve reasons being set forth accompanied by useful illustrations. A copy of this booklet will be sent upon request.

Bulletin 3225 published by **Schramm, Inc., West Chester, Pa.,** covers their entire line of engine driven arc welders. This bulletin illustrates and describes the various mountings, the 200, 300, 400 and 600-ampere welders for industrial uses and the self-propelled railroad-type. A copy may be had upon request.

The B. F. Goodrich Company has issued **The Wonder Book of Rubber,** portraying the romance of the rubber in-

A Machine for Shifting and Raising Your Track

If you are operating a quarry or open pit mine, engaged in a construction job where track must be raised and shifted frequently, here is a money saving investment. It is no longer necessary to maintain a large labor gang for this work. No longer need there be delays to your other operations. This machine and a few men will do the work, saving you time and money. If you shift or raise track, you need this machine.

NORDBERG MFG. CO., Milwaukee, Wis.

THE NORDBERG PATENTED TRACK SHIFTER

INFORMATION — pertaining to the profitable use of Hayward Buckets by many concerns may be obtained by addressing The Hayward Company, 52-54 Church St., New York, N. Y.
Hayward Buckets

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dustry and the part played in its development by the Goodrich Company. It gives a brief, but clear explanation of construction of tires, footwear, rubber sundries, mechanical goods and other products covering the range of American industry.

The book is not intended as a scientific discussion, but only as a story of rubber manufacture and use of rubber products. If you desire a copy of this book, kindly write the Public Relations Department, B. F. Goodrich Company, Akron, Ohio.

The **Wellman Engineering Company, 7002 Central Avenue, Cleveland, Ohio,** has recently issued a 6-page, well-illustrated folder descriptive of the new Williams "Champion" series of Favorite and Hercules buckets.

The **Lincoln Electric Company, Cleveland, Ohio,** manufacturers of "Linc-Weld" motors and "Stable-Arc" welders, have published a new 24-page bulletin known as Section No. 3304, covering a complete line of supplies for arc welding.

A full description with prices of electrode holders, cables, protective shields, protective lens, protective clothing and various supply parts is included as well as electrodes for all kinds of arc welding.

Among the new electrodes described is "Manganweld" for welding high manganese steel, "Aluminweld" for welding aluminum and "Hardweld" for hard or abrasion resisting welds. Fleetweld, a shielded arc electrode for mild steel is also discussed. The bulletin is for general distribution and copies may be secured from the company at Cleveland, Ohio.

An attractively laid-out folder describing the new line of Motorpumps has been prepared by **Ingersoll-Rand Company, 11 Broadway, New York.** There are Motorpumps from ¼ to 25 horsepower, good for 5 to 800 gallons per minute, for handling practically any liquid. For a copy of this folder or for further information on these pumps address the manufacturer.

Repair Shop Lathes is the title of a booklet just published by **South Bend Lathe Works, South Bend, Indiana** describing a new line of low-priced back-geared, screw cutting type lathes especially designed for maintenance shops of highway departments, contractors and engineers, and auto fleet repair shops. Seven sizes of lathes, from 8" to 36" swing are shown in various types of motor drive and in countershaft drive. Readers may obtain a copy free by writing to the Technical Service Department, of the South Bend Lathe Works.

The **Wellman Engineering Company, 7002 Central Ave., Cleveland, Ohio,** has recently issued a new six page bulletin descriptive of the Williams extra capacity, heavy-duty trailer. The bulletin is well illustrated with cut-away parts pictures showing the numerous features of the trailer. Readers may secure a copy free by writing this manufacturer.

The open-pit mining methods used in recovering limestone and the crushing equipment used in preparing it for rotary kiln feed are described in Information Circular 6603 of the United States Bureau of Mines by H. D. Baylor. The circular describes briefly the geology of the formation, history of development, the methods of prospecting and exploration employed and the method of mining. The latter is described in detail in the several operating steps together with cost tabulations. Copies may be obtained free from the **United States Bureau of Mines, Washington, D. C.**

MONITOR SILVER STRAND
The TIGER TRADE MARK is a symbol of Strength and Dependability
THE MARK FOR GENUINE AMERICAN WIRE ROPE

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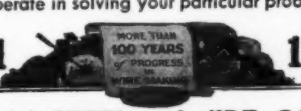
STEEL & WIRE COMPANY
WIRE ROPE

The Choice of Leaders

Monitor Silver Strand Wire Rope is an outstanding achievement of the American Steel & Wire Company. Into its manufacture go not only the highest quality materials—but the rich experience gained through 100 years of wire development. A standard for gruelling service—the strongest grade of steel used in wire rope construction assures strength to spare.

Monitor Silver Strand Wire Rope offers you many economical and service advantages. Write us for complete details—and request our engineers to cooperate in solving your particular problems.

1831  1932

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Export Distributors: United States Steel Products Company, New York

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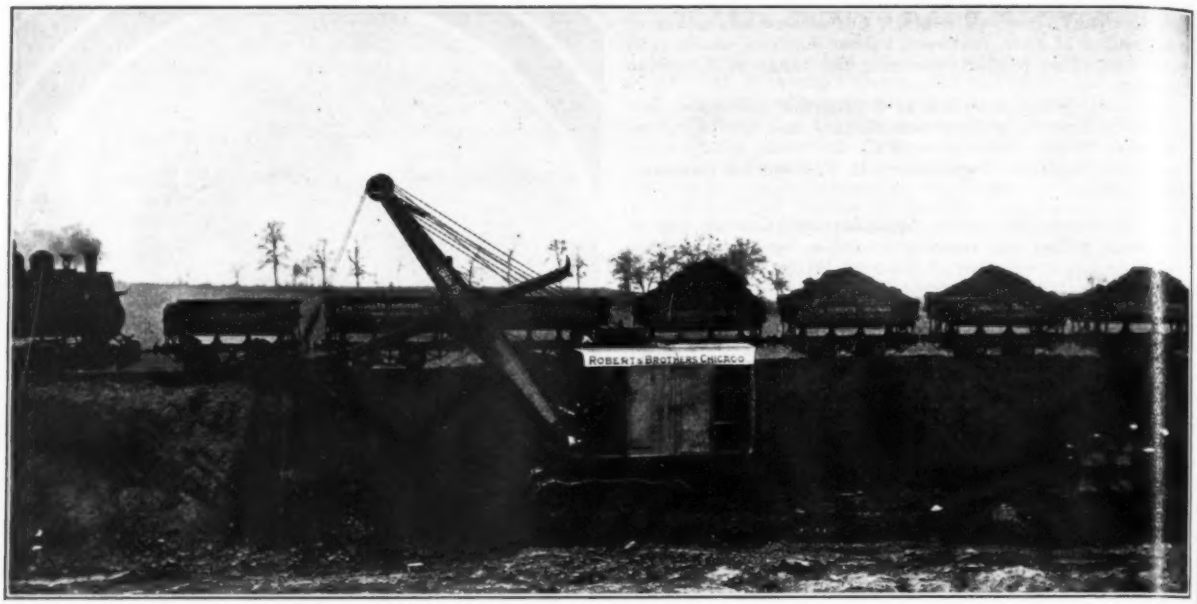
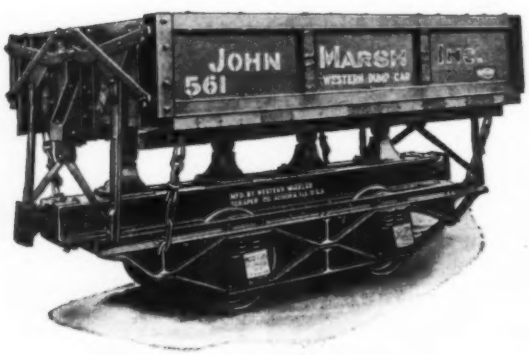


Western 4-yard cars on the job. These contractors make money by buying cars which they know will stand up, then working them to the limit.

YOU CAN'T OVERLOAD THEM

They are *Westerns*



Western Heavy Duty 4-yard Dump Car.

THE picture helps explain the popularity of Western 4-yard dump cars. Contractors and engineers KNOW that they will stand up under heavy work — season after season, job after job. Seemingly, they never wear out. If you need narrow gauge dump car equipment we can give you good news. Ask us. You can make more money with ***Westerns.***

P. S. We now build a narrow gauge dump car of 12-cubic yards capacity, drop door type.

WESTERN WHEELED SCRAPER COMPANY

DUMP CARS AND GRADING EQUIPMENT

AURORA, ILL., U. S. A.

WESTERN

For your convenience in writing to Western Wheeled Scraper Co. you will find a card bound in this issue.

Colorado Hotel Builds Dam and Pipe Line

(Continued from page 383)

hammers, and blasted with duPont powder. Fifty men were employed on the pipe line and 100 men on the dam. Because of the high altitude the working season is very short. The dam is about ninety per cent completed at this writing (June) and will be finished in four to six weeks. Pipe line and tunnels have been completed.

Bucyrus-Erie Grades for Pipe Line

In such valleys as were traversed by the pipe line the excavation was made with two Caterpillar 30 tractors, equipped with bulldozer blades. On the rugged mountain sides the shelf was excavated largely with a Bucyrus-Erie ½-yard gas shovel. Little covering was required on the pipe, as the line is drainable. Being without sags the danger of freezing in winter is eliminated by draining. The pipe was hauled from Colorado Springs by three 3-ton Mack trucks and trailers, and strung along the grade on small blocks. As the dresser couplings were applied the blocks were removed and the pipe covered where it lay. The total cost of dam and pipe line is estimated at $600,000.

Executives of the hotel company are Spencer Penrose and Charles L. Tutt. Specifications for the dam were prepared by Herbert I. Reid, consulting engineer, and J. H. Sanford, engineer in charge of construction. Edward H. Honnen is the general contractor. These gentlemen are all of Colorado Springs. Steel work on the dam was contracted by the American Bridge Company of Chicago, with specifications prepared by Frank P. McKibben, of Schenectady, New York and Black Gap, Pennsylvania, consulting engineer for General Electric Company.

EPITAPH TO AN EXCAVATING ENGINEER

Here lie the remains of Jeremiah Pound,
Who, in life, made many holes in the ground,
Except this one which he must regret was made
Not by machine but with a pick and spade.

—Charles Doubleyou

With South American Contractors

1, 2 and 3—Three Bucyrus-Erie D-2 Diesels grading for the Florida and Sarandi Railroad in Uruguay. These views were taken at Kilometers 1, 16 and 6 on the work of Compania Uruguaya de Obras Publicas.

4—Another view of work at Kilometer 16. The cut here is 9½ feet deep. Loading to ¾-meter, (about 1-yard) cars, this D-2 turns out 1110 to 1400 cubic yards in 16 hours.

5—Bucyrus-Erie D-2 Diesel grading a street in Montevideo. This machine is also owned and operated by the well-known South American contractors, Compania Uruguaya de Obras Publicas.

6—There is hard digging in this South American cut. Note the teeth marks and the chunks in the foreground.

7, 8 and 9—One of the sewer contracts of Compania General de Obras Publicas, another enterprising firm of South American dirt movers, is shown in this lower group of pictures. Their Bucyrus-Erie DA-2 drag shovel is digging a trench in Montevideo 4.40 meters (14.43 feet) deep and 2.10 meters (6.89 feet) wide.

NOT IN THE CONTRACT

Two colored boys were having an argument about ghosts. One of them claimed to have seen a ghost as he passed the cemetery the night before.

"Whut was dishere ghos' doin' when yo' las' seen him?" asked the doubting one.

"Jes fallin' behin', mistah; fallin' behin' rapid."

His wife determined to cure him of his bad ways, and with the aid of a sheet and an electric torch transformed herself into a very fair imitation of a ghost. Then she went out to the drunkard and shook him.

"Whash that?" murmured the toper.

"Satan," came the reply in a sepulchral tone.

"Shake handsh, old horsh. I married your sister."

1st B & C—Your husband is simply wild about you, isn't he?

2nd B & C—Yes, he raves about me in his sleep, but the absent minded fellow nearly always calls me by the wrong name.

"Why so sad?"

"It's all on account of a dream I had last night. I dreamed I went to see the boss at his house and he asked me to have a drink. I was willing, and he asked me if I wouldn't like a nice hot old fashioned toddy. 'Fine,' sez I. While we was standing around waiting for the hot water, I woke up and have been kickin' myself all day to think I didn't take it cold."

"Where'd you get the black eye?"

"I kissed the bride."

"But I thought that was customary."

"Well—not two months after the ceremony, it isn't."

"And then," sniffs a friend, "There's the fellow who had his coat sleeve buttons cut off because they hurt his nose."

Sign in bathroom in a local boarding house:

"Please Clean Tub After Bathing
Landlady."

John: Do you object to petting?

Mary: That's one thing that I have never done, yet.

John: You mean you have never petted?

Mary: No, objected.

Mrs. (sternly to husband arriving at 3:00 A. M.): What does the clock say?

Mr. (genially): It shay "tick-tock;" an' the lil doggies shay "bow-wow;" an' the lil pshy-cats shay "meow-meow."

The Scotchman said to his unfaithful wife: "Stand behind your lover. I am going to shoot you both."

When the cat's away the mice will play—but maybe the cat's not having such a rotten time either.

"What's the idea of all the crowd at church?"

"There's a traveling salesman down there confessing his sins."

"Father, I've a notion to settle down and go in for raising chickens."

"Better try owls. Their hours would suit you better."

Minister's Wife: "Ah, Mrs. Miles, one-half of the world is ignorant of how the other half lives."

Cottager: "Not in this village, ma'am."

"Times have changed."

"They certainly have. You used to see dogs running wild with tin cans tied to their tails, and now you see them riding in them with their noses up in the air."

"How is it he never takes you to the theatre any more?"

"Well, one evening it rained and we sat in the parlor."

Two New York clothing men hired a high-pressure salesman to go after Chicago business. Ikey called up the office shortly after the salesman left for Chicago to ask his partner, Abie, if he had any word from Chicago. Abie, much elated, told him yes, they had just received a wire and he would let the new stenographer read it to him over the phone. She commenced:

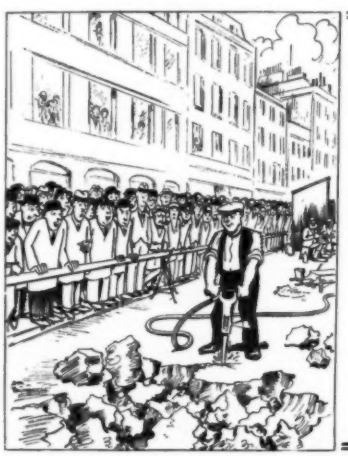
"Mailed in order from Marfields yesterday. Stop. Secured big order from Riley's today. Stop. Will get one from Sampson today. Stop. Calling on ————"

Here the irate Ikey interrupted and requested to talk to Abie again.

"Listen, Abie, can't you let that new girl alone for a minute?"

"Are there any slick crooks in this city?"

"Slick! Why, one night at a dance they stole my trousers and hung weights on my suspenders so I shouldn't miss them until they had gone."



The man who worked through his lunch hour rather than disappoint his public.

From "Brought Forward" by H. M. Bateman

"Mighty mean man Ah's working for."

"How come?"

"Why he done took de legs off from mah wheel-barrow."

"My good man, does this dog possess a family tree?"

"Oh, no madam—he has no particular tree."

Hubby—Don't let the baby put that quarter in his mouth, there are germs on it.

Wifie—Nonsense! Germs could not live on the money you make.

"Why do they call Brown 'Skipper'? Was he a sea captain once in his lifetime?"

"No, he was an embezzling bank cashier."

Diner—Is this beef or is it mutton, waiter?

Waiter—Can't you tell by the taste?

Diner—No.

Waiter—Then what difference does it make?

Runner—I'd like to go to my mother-in-law's funeral this afternoon.

Boss—So would I.

Teacher: "Johnny, can you define nonsense?"

Johnny: "Yes, teacher—an elephant hanging over a cliff with its tail tied to a daisy!"

POSITIONS WANTED

Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wis.

TRANSITMAN — OFFICE WORK

Experienced transitman with mining experience desires transit work, or will work as rodman, chainman or engineer's helper. Have also had experience as timekeeper, and much experience in safety work. Good references. Located Wisconsin, will go anywhere. Box 3513.

SHOVEL OPERATOR

Have 22 years' experience on general excavating and grading projects on gasoline, electric or steam powered machines. Can give best of references and can do own repair work. Will go anywhere. Present location Louisiana. Box 3605.

FOREMAN—ESTIMATOR—ENGINEER

15 years experience construction field as above. Age 34, married, war veteran, not afraid of hard work. Graduate University of Wisconsin College of Engineering. Will go anywhere. Excellent references. Available September 1st. Location, Illinois. Box 3703.

CLAMSHELL—DRAGLINE OPERATOR

6 years' experience on stripping and loading operations. Prefer operating Bucyrus-Erie dragline anywhere. Can make own repairs and furnish good references. Present location, South Carolina. Box 3501.

DRAGLINE-CRANE-SHOVEL OPERATOR

Over 15 years' experience on gasoline and Diesel machines, large and small in quarries; on steel work; gravel pits and highway work. Willing to go anywhere on any size machine. Can do own repair work and can furnish excellent references. Married. Present location Illinois. Box 3601.

DRAGLINE — SHOVEL — CRANE OPERATOR

Have 100% rating in recent Federal Civil Service examination. Experience covers years on drainage, quarry, highway grading and mine stripping. Willing to go anywhere in U.S.A. Can do own repair work and furnish excellent references. Married. Present location, South Dakota. Box 3502.

SHOVEL OPERATOR

15 years' experience on railroad, highway and general excavating. Willing to go anywhere in U.S.A. Can do own repair work and furnish excellent references. Married. Present location, Illinois. Box 3503.

DRAGLINE OPERATOR

Experience covers 11 years' on Diesel and gasoline draglines on drainage, canal, levee and rock work. Expert gasoline mechanic, can build gasoline engines from the ground up. Willing to go anywhere in U.S.A. Married. 30 years old. Can handle own repair work and furnish A-1 references. Present location, Arkansas. Box 3504.

CRANE-SHOVEL OPERATOR

16 years' of experience operating gasoline and steam machines on highway and rock grading and general excavating. Prefer operating small gas or steam shovel anywhere in the East. Married. Age 36 years. Can do own repair work and furnish first class references. Present location, New York. Box 3303.

SHOVEL OPERATOR

Have ten years' experience on Gas+Air, gasoline and steam shovels. Willing to go anywhere in U.S.A. Married. Best of references. Can do own repair work. Present location, Wisconsin. Box 3203.

DRAGLINE-SHOVEL-CRANE OPERATOR

18 years' on gasoline, gas+air, Diesel and steam machines on general excavating, coal and ore stripping and highway grading. Will go anywhere. Married. A-1 references. Age 38. Present location, Illinois. Box 3404.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie Diesel, E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 3305.

DRAGLINE-SHOVEL OPERATOR

14 years' experience on Diesel, gasoline and steam machines on highway grading and levee building. Would like to operate dragline anywhere in U. S. A. Married. Can do own repair work. A-1 references. Present location, Arkansas. Box 3306.

CRANE-SHOVEL OPERATOR

Have 35 years' experience on gasoline and steam machines on highway and railroad grading; canal and quarry rock. Willing to go anywhere in U.S.A. on any size or make shovel. Married. Can furnish the very best of references and can handle own repair work. Present location, South Carolina. Box 3304.

SHOVEL OPERATOR

15 years' experience on electric, Gas+Air and steam machines on basement excavating; highway and railroad grading. Will go anywhere in U.S.A. Married. Age 35. A-1 references. Can do own repairing. Present location Pennsylvania. Box 3604.

DRAGLINE-SHOVEL OPERATOR

Have had thirteen years' experience operating Bucyrus-Erie 20-B, 30-B, 50-B and 175-B steam, Diesel and electric machines. Have built levees, road and railroad embankments; dug canals, gravel and stripped phosphate. Can furnish good references. Willing to go anywhere in U.S.A. or foreign countries. Present location, Louisiana. Box 3402.

DRAGLINE-SHOVEL OPERATOR

8 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U.S.A. Also have two years' machine shop experience. Can do own repairing and furnish A-1 references. Present location, Florida. Box 3406.

DRAGLINE OPERATOR

Experienced on 30-B and 50-B Diesel machines, on ditch and levee work. Willing to go anywhere in U.S.A. Single. Age 28. Can do own repair work. Reliable references. Present location Kentucky. Box 3603.

SHOVEL OPERATOR

18 years' experience on Erie, Osgood, Thew and Marion machines on highway, basement, railroad and general excavating. Willing to go anywhere. Can take complete charge of repairing. A-1 references. Present location, Ohio. Box 3509.

DRAGLINE — SHOVEL OPERATOR

Experience covers 15 years' on Diesel, gasoline and steam machines on drainage and levee work, pit work, and highway grading. Prefer dragline work anywhere in U.S.A. Can do own repairing. Married. Present location, Iowa. Box 3510.

DRAGLINE—CRANE—SHOVEL OPERATOR

16 years' experience on drainage work, railroad and highway grading. Will go anywhere on any type and make machine. Can do own repair work. Married. Present location, Indiana. Box 3511.

DRAGLINE—CLAMSHELL—SHOVEL OPERATOR

18 years' experience on electric, gasoline, Diesel and steam machines on all classes of work. Will go anywhere in U.S.A. Can do all own repair work. Married. Reliable references. Present location, Illinois. Box 3512.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

22 years' experience on Gas+Air, gasoline and steam machines on highway, coal stripping operations, irrigation work, pile driving and many other miscellaneous jobs. Will go anyplace in U.S.A. Can handle own repair work. Married. Can furnish excellent references. Present location, New York state. Box 3405.

DRAGLINE-CLAMSHELL OPERATOR

Experience covers years on Diesel and gasoline machines on levee and highway work. Willing to go anywhere in U.S.A. Single. Age 27. Can do own repair work and furnish reliable references. Present location, Louisiana. Box 3403.

SUPERINTENDENT-DRAGLINE OPERATIONS

Have superintended dragline and shovel work for many years on mining operations of various types, also rock quarries. Willing to go anywhere in U.S.A. 43 years old. Have excellent references regarding character and ability. Present location, Tennessee. Box 3211.

DRAGLINE OPERATOR

18 years on Diesel, gasoline and steam draglines on levees and canals. Will go anywhere on any make and model machine. Married. Can handle own repairing. Reliable references. Present location, Louisiana. Box 3508.

ENGINEER-SUPERINTENDENT

wants connection with contractor. Twenty years exceptional experience factory construction, rock work, roads, tunnels, dams, hydro-electric developments, foundations. Have produced results under difficult conditions and can handle large program in whole or in part. Eight years Latin America. Will go anywhere. Location, Illinois. Box 3701.

SHOVEL OPERATOR

Have 13 years' experience on Diesel, gasoline, Gas+Air, electric and steam machines on highway and railroad grading, quarry work and general excavating. Married. Willing to go anywhere. Can do any repair and service work. Familiar with Diesel engines. Reliable references. Present location, Tennessee. Box 3307.

HOPPER OPERATOR

Wanted—Bachelor job as hopper operator on road work. Fully experienced on all types of highway building. Can also serve as tractor operator. Single. 30 years old. Willing to go anywhere in U.S.A. Reliable references furnished. Present location, Indiana. Box 3308.

SHOVEL OPERATOR

Fully experienced on general types of excavating. Have operated Erie, Osgood, Lorain and Northwest gasoline and steam machines. Willing to work one month without pay as demonstration. If employer is satisfied he may pay me. Have full set of own tools and can do own repair work. Willing to go anywhere. Can come on twenty-four hours notice. Single. Reliable references furnished. Present location, West Virginia. Box 3702.

CLAMSHELL-CRANE-SHOVEL OPERATOR

Experienced on Gas+Air and steam machines on general construction work. Willing to operate anywhere in U.S.A. Married. Can handle own repairing. A-1 references furnished. Present location North Carolina. Box 3602.

CONSTRUCTION AND MAINTENANCE ENGINEER

Over 25 years' experience on all types of shovel, cranes, locomotives on general construction work. Capable of taking full charge of crew. At present located in Australia. Available for work in New Zealand, China or Federated Malay States. Can furnish excellent recommendations. Address replies to W. J. A., 22 Ruthven Street, Waverly, N. S. Wales, Australia.

DRAGLINE-SHOVEL OPERATOR

Have twelve years' experience on Bucyrus-Erie, Monighan, Marion, Osgood, Northwest, Koehring, Link-Belt and P. & H. shovels and draglines—steam—Diesel and gasoline on drainage, quarry and ore pits and on general excavating. Willing to go anywhere in U.S.A. or foreign countries. Can do own repairing and furnish reliable references. Present location, Indiana. Box 3401.

SHOVEL OPERATOR

Have operated Bucyrus-Erie 320-B and 750-B electric stripping machines for past seven years. Willing to go anywhere in U.S.A. Can do own repair work and furnish A-1 references. Married. Present location, Illinois. Box 3505.

CLAMSHELL—CRANE—SHOVEL OPERATOR

Experience includes 14 years on gasoline, electric and steam machines on all types of excavating. Willing to go anywhere on any type machine. Can do own repair work and furnish reliable references. Single. Present location, Pennsylvania. Box 3506.

CLAMSHELL — CRANE OPERATOR

Have 14 years' experience on steam machines on all types of general excavating. Will go anywhere on any kind of work. Can do own repairing and furnish excellent references. Married. Present location South Carolina. Box 3507.

DRAGLINE-SHOVEL OPERATOR

Experienced on Bucyrus-Erie D-2 and 30-B Diesel machines, on highway grading and canal drainage. Will go anywhere. Married. Age 37. Reliable references furnished. Can handle own repair work. Present location, Kentucky. Box 3204.

FIELD NOTES

(Continued from Page 387)

rely upon them to enter into the contract. The defendant is responsible for the consequences of the plaintiff's reliance upon its misstatements, regardless of whether they were made in good faith."

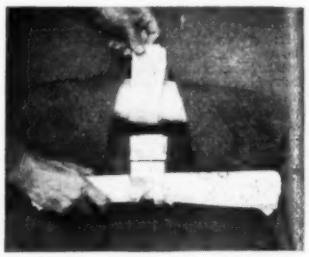
The foregoing case appears to be in accord with the great weight of authority on the point involved. And, in the light of this holding, it is obvious that a contractor has the right to rely upon the representations of an owner as to the character of subsoil, when these are made with assumed superior knowledge. And in the event they prove false to the damage of the contractor in acting upon them, the latter will have a right to damages, regardless of the fact that the owner acted in good faith in making the representations, and was honestly mistaken in his statements.

— Leslie Childs.

Editor's Note: Another case where rock excavation was not covered in the contract was discussed in December, 1931, Excavating Engineer.

Emergency Coat Hanger

COAT HANGERS are common things, but around the average construction job office or shovel they are frequently as scarce as the proverbial hen's teeth. The illustration shows an emergency affair which is not altogether without its virtue of usefulness. Take a common newspaper. Tear off one sheet and lay it aside. Roll the paper up and stick it into the coat as shown. Fold the extra sheet a number of times and slip it around the center of the part in the coat. Punch a hole in the upper ends for the nail or hook and there you are. An emergency hanger and a good one.



—Frank W. Bentley, Jr.

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Under 2 Yards

ERIE TYPE B-2 high lift steam shovel, "Cat" mounted. Good operating condition. Will rent. Priced to sell. Box 286-SS.

TYPE B-2 STEAM SHOVEL, number 9830, mounted on single shaft caterpillar-type mounting. Equipped with 21-foot 3-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper. Boom hoist and Mass. standard boiler. Located vicinity of Boston. Reasonably priced. Box 345-SS.

BUCYRUS-ERIE brand new 1035 gasoline shovel, rope or chain crowd. Also clamshell or dragline equipment. At price you cannot refuse to consider. Box 356-SS.

BUCYRUS 20-B steam shovel ¾-yd. Dipper. $1800.00. Chicago territory. Box 348-SS.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted, 19-foot 9-inch boom, 16-foot dipper handle, ¾-yard dipper, boom hoist. New 1924. Excellent condition; new flues in boiler. Located near Chicago. Priced to sell. Box 157-SS.

BUCYRUS-ERIE SLIGHTLY USED — Factory guaranteed 1¼-cubic-yard High Lift friction gasoline shovel. Box 354-SS.

BUCYRUS ERIE So. Milwaukee, Wis.

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FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

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- ☐ B-E 32-B Gas Drgln. 45-ft. boom. Like new.
- ☐ Lorain 55 1-yd. Shovel. A-1 condition.
- ☐ B-E 41-B steam 50-ft. boom special for pile driving.
- ☐ Monighan Dragline 60-ft. boom. Priced right.

Name .....

Address .....

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FOUR TYPE B BUCYRUS-ERIE STEAM SHOVELS. Good operating condition. $1000 each. Box 328-SS.

BUCYRUS-ERIE 41-B steam. 50-foot boom. Specially arranged for pile driving service. Will rent. Box 342-SS.

ERIE GAS+AIR Combination high lift shovel and dragline equipment. Chain drive. "Cats." Very good condition. Located vicinity Chicago. Box 337-SS.

ERIE TYPE B-2 STANDARD STEAM SHOVEL, "Cat" mounted. Located near New York City. Will rent. Box 317-SS.

USED TYPE "O" THEW STEAM SHOVEL, shop number about 2100; 20' boom, 16' dipper handle, ¾-yd. dipper. Good running condition. Located Milwaukee vicinity. Bargain. Box 261-SS.

LIMA 101, 1¼-CUBIC-YARD GASOLINE ROPE CROWD SHOVEL. Electric starter and lights. Shipped from factory late 1930. Excellent condition. Will rent. Box 322-SS.

MARION MODEL 36 STEAM STRIPPING SHOVEL, shop number about 4100, 30-foot boom, 18-foot 6-inch dipper handle, 2-cubic-yard dipper, caterpillar mounted. Located near Isabel, South Dakota. Approximately $2000.00 worth of spare parts included. Immediately available. Priced to sell. Box 233-SS.

P&H MODEL 204. Shop number above 2200, combination Shovel Clamshell. 19' shovel boom, 14'6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 254-SS.

FOR SALE OR RENT

BUCYRUS-ERIE 20-B DIESEL, 40-foot dragline boom and extra high lift shovel attachment. ¾-cubic-yard Type "S" Page bucket.
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LIMA 101 1¼-CUBIC-YARD GASOLINE SHOVEL. Electric starter. New May, 1931. Good condition. Will demonstrate—will rent. Box 358-SS.

OSGOOD GASOLINE ONE-CUBIC-YARD COMBINATION SHOVEL-CLAMSHELL-DRAGLINE. Six cylinder Beaver motor. Overhauled late 1931. Bargain price. Box 323-SS.

UNIT MODEL B three-quarter swing, ⅜-cubic-yard Shovel. New 1928. Excellent Condition. Box 350-SS.

BUCYRUS-ERIE USED 20-B gasoline shovel. Good condition. Box 353-SS.

BUCYRUS-ERIE 32-B gas shovel, slightly used. Bargain. Will rent. Box 341-SS.

BUCYRUS-ERIE TYPE GA-2, EXTRA HIGH LIFT, GAS+AIR SHOVEL, shop number 10509, steel cab, mounted on single shaft drive caterpillars, equipped with 24-foot boom, 18-foot dipper handle, one-cubic-yard dipper. Located in Central Michigan. A real bargain at $4800.00. Box 333-SS.

ERIE TYPE "GA-2" GAS+AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of the Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

USED BUCYRUS 30-B DIESEL SHOVEL—25'9" Boom, 14' Dipper Handle, including Dragline Equipment. Box 261-SS.

ERIE REBUILT B-2 standard steam shovel, power boom hoist, new style "Cats." Factory guaranteed. Box 252-SS.

ERIE TYPE-B high lift steam shovel rebuilt July 1931 including new boiler. Since used 4 months. Excellent condition. Will rent. Box 285-SS.

REBUILT GA-2 ERIE SHOVEL mounted on new single shaft caterpillar, 1¼-cubic-yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

NORTHWEST SHOVEL, model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

The new Westinghouse type MC Totally-enclosed Shovel Motor.

Here's a motor

DESIGNED FOR SHOVEL PROFITS

NO matter how strenuous the requirements of your shovel work—here's a motor that will meet them. The new Westinghouse type MC Shovel Motor is engineered and designed for shovel performance . . . to increase digging profits.

The troubles and expense that result from motor parts loosened from jar or overheating have been eliminated. This new motor sets the pace with such exclusive features for trouble-free and low-maintenance performance as the following:

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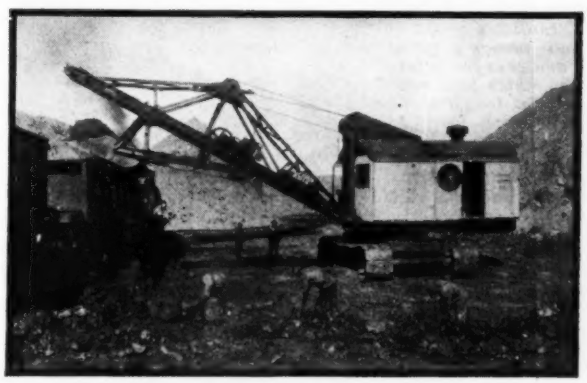

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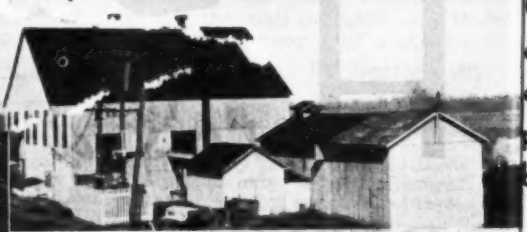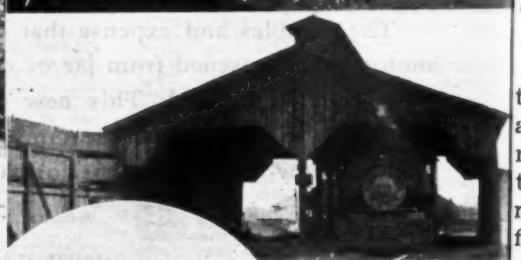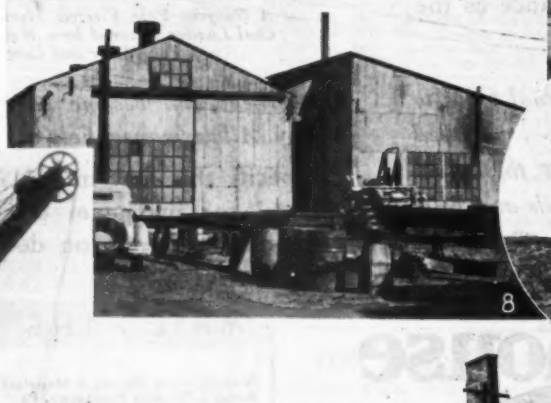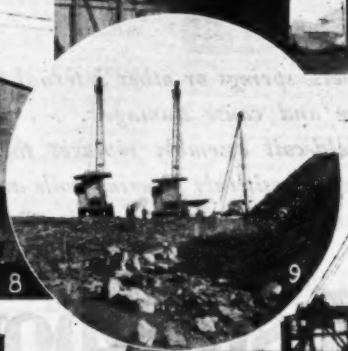
1. This dipper holds 12 yards, struck measure. 2. Here is the tipple where 5,303 tons have been run in an 8-hour shift. 3. And this dipper holds 18 yards without the heap. 4. It takes two coal loaders to keep up with the big 18-yard stripper. Here's one carrying a 3-yard dipper. The other is shown in view 7 and carries a 2½-yard dipper. Both are Bucyrus-Erie electrics. 5. Into this group of buildings Enos pumps a lot of atmosphere and changes it into liquid oxygen, which they combine with carbon to form the powerful explosives used to shatter the rocky overburden. 6. One of the battery of new Sullivan horizontal-bore drills. The auger cuts into the rock bank as though it were cheese. 8. The shops are grouped with office and tipple. 9. Part of the fleet of Loomis electric well drills which has given excellent service. 10. Dumping a train of Westerns into the hopper. 11. Here's as tough going as you'll find in any strip coal mine. The 60-foot bank contains 50 feet of rock. 12. Mine office and warehouse. 13. This giant Bucyrus-Erie heaps an 18-yard dipper at every bite. Its movable counterweight is a revolutionary development in stripping shovels.